



Environmental Impact Report  
California Marine Life Protection Act Initiative  
Central Coast Marine Protected Areas Project  
State Clearinghouse #2006072060

Prepared for: **California Department of Fish and Game**



Prepared by:  **Jones & Stokes**

March 2007



**Final  
Environmental Impact Report  
California Marine Life Protection Act Initiative  
Central Coast Marine Protected Areas Project**

**State Clearinghouse #2006072060**

*Prepared for:*

California Department of Fish and Game  
Marine Region  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940  
Contact: John Ugoretz,  
Nearshore Ecosystem/MLPA Coordinator  
831/649-2893

*Prepared by:*

Jones & Stokes  
268 Grand Avenue  
Oakland, CA 94610-4724  
Contact: Jeff Thomas  
510/433-8962

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## Acronyms and Abbreviations

B	Beneficial
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
Commission	California Fish and Game Commission
DEIR	Draft environmental impact report
Department	California Department of Fish and Game
FEIR	Final environmental impact report
MLMA	Marine Life Management Act
MLPA	California Marine Life Protection Act
MMAIA	Marine Managed Area Improvement Act
MPAs	Central Coast Marine Protected Areas
NI	No impact
NOA	Notice of availability
SMCA	State Marine Conservation Area
SMR	State Marine Reserve
SMRMA	State Marine Recreational Management Area



## **Chapter 1. Introduction**

### **1.1. CEQA Compliance**

Section 15132 of the California Environmental Quality Act (CEQA) Guidelines requires that a final environmental impact report (FEIR) consist of the following elements.

- Draft environmental impact report (DEIR) or a revision of the DEIR.
- Comments and recommendations received on the DEIR, either verbatim or in summary.
- List of persons, organizations, and public agencies commenting on the DEIR.
- Responses of the lead agency to significant environmental concerns raised in the review and consultation process.
- Any other information added by the lead agency.

This FEIR for the Central Coast Marine Protected Areas (MPAs) Project (Proposed Project, or project) of the California Marine Life Protection Act (MLPA) Initiative has been prepared in accordance with CEQA and the CEQA Guidelines. The DEIR together with the responses to comments on the DEIR constitute the FEIR for the Proposed Project. The FEIR is an informational document prepared by the California Department of Fish and Game (Department) on behalf of the lead agency, the California Fish and Game Commission (Commission), that must be considered by decision-makers before approving or denying the Proposed Project.

### **1.2. Format and Organization of Final Environmental Impact Report**

This FEIR comprises three chapters containing the information required by CEQA Guidelines, as outlined above. Chapter 1 describes the DEIR public review process and provides a list of organizations, public agencies, and members of the public that commented on the DEIR, as well as a list of persons involved in the preparation of responses to comments, and a summary table of impacts and mitigation measures. Chapter 2 contains comment letters received on the DEIR and the Commission's responses to those comments. Chapter 3 presents changes made to the DEIR in response to comments. Changes to the DEIR are presented in errata format in Chapter 3 and are also referenced in the Chapter 2 responses.

When certified by the Commission, the FEIR will consist of the following components, as required by CEQA.

- The DEIR, published on November 17, 2006.
- The FEIR, consisting of

- all comments received on the DEIR either orally or in writing,
- responses to those comments; and
- any changes or revisions to the DEIR.

### **1.3. Public Review of Draft Environmental Impact Report**

Upon completion of the DEIR, the Commission filed a notice of completion with the State Clearinghouse and issued a notice of availability (NOA) consistent with CEQA Guidelines Sections 15085 and 15087. The NOA provided notice of the public comment period that began on November 17, 2006, and ended on December 31, 2006. The DEIR was submitted to the State Clearinghouse for circulation to responsible and trustee agencies. In addition, the Department distributed 83 copies of the NOA to state, regional, and local agencies, as well as individuals. The DEIR also was made available to the public via the Marine Life Protection Act Initiative website. The Commission, the Department, and their consultants have responded to all comments on the DEIR received during the public comment period.

Copies of the DEIR are on file at the following locations.

- Department of Fish and Game  
Marine Region  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940
- Other Department Marine Region offices
- Various public libraries

Call 831-649-2893 for a full list of locations.

### **1.4. Revisions to Draft Environmental Impact Report**

In response to comments received on the DEIR, the Commission deleted, added, and/or revised text, tables, and figures. The changes do not result in any new significant environmental impacts or substantially increase the severity of an environmental impact. Therefore, pursuant to Section 15088.5 of CEQA Guidelines, the Commission is not required to recirculate the DEIR prior to certification.

### **1.5. Comments Received on Draft Environmental Impact Report**

The following public agencies, organizations, and individuals submitted comments on the DEIR.

### **Public Agencies**

- California Department of Transportation (Caltrans)
- Moss Landing Harbor District
- Port San Luis Harbor District

### **Organizations**

- California Fisheries Coalition
- Monterey Bay Aquarium Research Institute
- Morro Bay National Estuary Program
- National Resources Defense Council/The Otter Project/The Ocean Conservancy
- Pacific Fishery Management Council
- PRBO Conservation Science

### **Individuals**

- Steve Black
- Paul Douglas
- Willow Forest
- Greg Glenn
- Tom and Sheri Hafer
- Bill James
- Jakki Keal and Linda Jamane
- Bill Richmond
- Jesus Ruiz
- Marc Shargel

- David Valentine
- John Wolfe

## **1.6. Preparation of Final Environmental Impact Report**

The FEIR was prepared by the Commission, the Department and the consultants listed below. All work reflects the Commission's independent judgment and analysis.

### **1.6.1. Lead Agency**

#### **1.6.1.1. California Fish and Game Commission**

#### **1.6.1.2. California Department of Fish and Game**

Marine Region  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940  
Contact: John Ugoretz,  
Nearshore Ecosystem Coordinator/Central Marine Region Manager

### **1.6.2. Final EIR Authors**

#### **1.6.2.1. Jones & Stokes**

268 Grand Avenue  
Oakland, CA 94610

### **Project Management Team**

- Mike Rushton—Project Director
- Jeff Thomas—Project Manager
- Michael Murrell Stevenson—Technical Manager

### **Technical Team**

- Chris Coelho
- John Durnan
- Alexander Hardy
- Heidi Lypps





## **Chapter 2. Comments and Responses**

### **2.1. Introduction**

A public review process was held for the Central Coast MPAs Project DEIR. The purpose of the public review process was to provide information and solicit input on the content of the Proposed Project and DEIR. CEQA requires the Commission to make a good-faith reasoned analysis and respond to comments received (CEQA Guidelines, Section 15088). This chapter contains copies of the comment letters received on the Central Coast MPAs Project DEIR during the public review process and responses to each comment.

Each comment letter received on the DEIR has been assigned a letter (A–W); comments within each letter have been numbered consecutively in the right margin of the letter adjacent to the individual comment (e.g., A-1, A-2, B-1, B-2...). Each comment letter is followed by the Department's response to that letter. The responses are numbered to correspond with the comments as identified in the right margin of the letter. Where the response indicates that a change was made to the DEIR, the relevant text change can be found in Chapter 3 of this FEIR.

As required by CEQA Guidelines Section 15132, this chapter provides responses to substantive and significant environmental issues raised in the comments. Detailed responses are not provided to comments on the merits of the Proposed Project. When a comment is not directed to significant environmental issues related to the Proposed Project and/or the DEIR, the comment is noted but no response is warranted.

### **2.2. Responses to Comments**

The following represents the Commission's responses to all comments received during the public comment period on the DEIR. Table 2-1 lists the commenters and indicates the order in which the comment letters and responses to those letters can be found in this document. In addition to specific responses to individual comments, master responses are provided to address several major recurring themes that have been noted in comments received throughout this process. Unless otherwise noted, all code sections cited are to the Fish and Game Code.

**Table 2-1. Commenters on DEIR**

<b>Letter</b>	<b>Commenter</b>	<b>Date of Comments</b>
A	Steve Black	December 3, 2006
B	Bill Richmond	December 5, 2006
C	Paul Douglas	December 8, 2006
D	California Department of Transportation, District 4	December 8, 2006
E	Tom and Sheri Hafer	December 13, 2006
F	Port San Luis Harbor District	December 18, 2006
G	PRBO Conservation Science	December 19, 2006
H	PRBO Conservation Science	December 20, 2006
I	Greg Glenn	December 23, 2006
J	Morro Bay National Estuary Program	December 26, 2006
K	Willow Forest	December 27, 2006
L	Willow Forest	December 28, 2006
M	David Valentine	December 28, 2006
N	Natural Resources Defense Council, the Otter Project, the Ocean Conservancy	December 18, 2006
O	California Fisheries Coalition	December 29, 2006
P	Moss Landing Harbor District	December 29, 2006
Q	Monterey Bay Aquarium Research Institute	December 29, 2006
R	Pacific Fishery Management Council	December 29, 2006
S	Bill James	December 30, 2006
T	Jesus Ruiz	December 31, 2006
U	John Wolfe	January 1, 2007
V	Mark Shargel	January 2, 2007
W	Jakki Keal and Linda Yamane	January 6, 2007

### **2.2.1. Master Response 1.0—Improper Implementation of the MLPA**

An overarching theme of some comments has been that the MLPA process in general, and the Central Coast project in particular, either exceeds the scope of the statute, or otherwise impermissibly deviates from its requirements, particularly with its use of the State Marine Reserve (SMR) designation. Although these comments constitute unsubstantiated narrative or opinion, a discussion here is useful to understand the context within which the other themes are addressed.

At the outset, the MLPA is an environmental statute and remedial in nature; remedial statutes are liberally construed so as to effectuate their object and purpose, and the remedial effect of provisions should not be impaired by construction. (3 Sutherland Statutory Construction (6th ed.), § 60:2, p. 199). This construction of Fish and Game laws has been supported in published cases; conversely, statutory interpretations of Fish and Game statutes will be rejected when they lead to absurd results in light of the clear policy statement of legislative purpose. (*In re Makings* (1927) 200 Cal. 474, 478-479; *Pennisi v. Department of Fish & Game* (1979) 97 Cal.App.3d 268, 272-273; *Young v. Department of Fish & Game* (1981) 124 Cal.App.3d 257, 271; *Department of Fish & Game v. Anderson-Cottonwood Irrigation Dist.* (1992) 8 Cal.App.4th 1554, 1563).

In enacting the MLPA, the Legislature stated why it was necessary to modify the existing collection of MPAs to ensure that they are designed and managed “to take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves.” (Section 2851(h)). “Marine life reserves,” which are now called State Marine Reserves, are defined in the MLPA as no-take areas. (Section 2852(d)). The MLPA also directs the MLPA Program to have an “improved” SMR component, and contemplates that the process for the establishment, modification, or abolishment of existing MPAs includes the creation of new MPAs. (Sections 2853(b)(6), 2853(c)(5), 2855(a), 2857(c)). The agenda driving this process is the one expressed by the Legislature in its detailed articulation of MLPA through its findings and declarations, definitions, goals and elements, Master Plan components, and objectives and guidelines. (Sections 2851-2853, 2856, 2867). Since the Legislature does not engage in idle acts, the fact that it expressly authorized the Commission in Section 2860 to regulate commercial and recreational fishing and any other taking of marine species in MPAs, and not just marine reserves, presumes such authority can be exercised.

Of course, how the Commission exercises that authority is a matter solely within its purview. In any case, the authorization of new SMRs cannot be reasonably construed as reflecting a bias against fishing, when the MLPA expressly states that such reserves “may help rebuild depleted fisheries.” (Section 2851(f)). Further, the *Marine Life Management Act* (MLMA) links the maintenance, restoration, and enhancement of marine habitat to the primary fishery management goal of sustainability. In that respect, the Legislature also emphasizes that even fishery management decisions – which include the prevention of overfishing, the rebuilding of depressed stocks, the facilitation of conservation and long-term protection, and the restoration of marine fishery habitats – must not sacrifice long-term goals for short-term benefits. (Sections 7055(a), 7055(b), 7056(a), 7056(i)).

### **2.2.2. Master Response 2.0—Inadequacy of Science Standard**

A recurring theme questions the adequacy of the science driving the MLPA process, asserting that the science being used is not the “Best Available Scientific Information” (BASI) and recommending that the process not continue until more research and study is conducted. However, state law emphasizes timeliness over

certainty or perfection. By way of review, in 2004 the National Academy of Sciences sponsored a major discussion of BASI in the context of the *Magnuson-Stevens Fishery Management Act*, and noted that "best" explicitly suggests that there is no better scientific information available and implicitly suggests the use of the most relevant and contemporary data and methods. However, the MLPA process is expressly based "on sound scientific guidelines" and "the best readily available science." (Sections 2853(b)(5), 2855(a)). The MLPA use of best *readily available* science is an important qualification that emphasizes timeliness over certainty or perfection. Similarly, the *Marine Life Management Act*, which predates the MLPA, qualifies its application of BASI with the language: "...on other relevant information that the department possesses, or on the scientific information or other relevant information that can be obtained *without substantially delaying the preparation of the plan.*" [*Emphasis added*] (Section 7072(b)).

The MLPA emphasis of timeliness over certainty or perfection of information is further underscored by the concept of adaptive management, which recognizes that this process proceeds in the face of "scientific uncertainty" and prospectively contemplates that "monitoring and evaluation shall be emphasized so that the interaction of different elements within marine systems may be better understood." (Section 2852.) The objective of adaptive management under the MLPA is not to reduce uncertainty through increased scientific rigor, but rather to produce practical information that guides management decisions. To date, the California experience with adaptive management of marine resources is exemplified through the *Marine Life Management Act* (Sections 90.1, 7056(g)) and the Nearshore Fishery Management Plan, which addresses the critical concepts of the *precautionary principle*, and the variability of adaptive management strategies in *data poor*, *data moderate*, and *data rich* circumstances.

That the Legislature, as a matter of public policy, has favored timeliness over certainty of information does not mean that inadequate science should be used. In that respect, external peer review is a strong guarantor of the adequacy of the science. The MLPA mandates that an external peer review process be established, and allows use of the process identified in Section 7062 of the *Marine Life Management Act* "to the extent practicable." (Section 2858.) Section 7062(a) allows for submission to peer review of documents "that include, but are not limited to [marine living resources management documents]." However, such submissions are discretionary.

Also, it is important to understand that the charge of the peer review entity is not to authenticate the data presented to them, but to evaluate the scientific methodology employed and the facial plausibility of the conclusions that can be drawn there from. More importantly, the peer review entity is not expected to approve, disapprove, or comment on the wisdom of those conclusions. This must be so, because reasonable people can in good faith arrive at different conclusions using the same data and methodology.

In that regard, the Department undertook such a peer review of the scientific basis for the Master Plan. Consistent with the statutory direction of Section 7062, the scientific design guidelines used in preparing alternative MPA recommendations were

reviewed by a panel convened by Oregon Seagrant. The reviewers were selected by Seagrant independent of the Department, and asked to review: (1) the MLPA Master Plan Science Advisory Team (SAT) guidance on MPA network design; and (2) the consideration of habitats in the design of MPAs provided by the SAT. The reviewers were also asked: (1) in general, is the document logically organized and factual? (2) are its recommendations clearly and unambiguously stated? (3) are there specific statements that you feel are incorrect or misleading? and (4) is there anything of importance that was not stated or covered? The three reviewers found the document and advice appropriate and not lacking in any way.

Additionally, the scientific review and analysis of alternative MPA recommendations was similarly reviewed. An independent panel convened by California Seagrant reviewed the documents prepared by the SAT in analysis of various alternatives. Again, the reviewers found the documents, recommendations, and methodologies scientifically sound and concurrent with available information.

### **2.2.3. Master Response 3.0—Inadequacy of Socioeconomic Analyses**

A variant of Theme One is that the socioeconomic information is fatally deficient. However, nothing in the MLPA imposes an affirmative duty to generate socioeconomic data beyond that which is required by other applicable laws, such as the *Administrative Procedures Act* (Government Code § 11346.3) or—to the extent a socioeconomic change induces significant adverse environmental impacts—the *California Environmental Quality Act*. The MLPA authorizes the establishment of a Master Plan team of scientists, one of which “may” have expertise in socioeconomics (Section 2855(b)(3)(A)). The preferred siting alternative must incorporate information and views provided by people who live in the area and other interested parties, including economic information (Section 2857(a)). Here, the term “economic information” relates back to “information” so we reasonably interpret this to mean that it is the “people who live in the area and other interested parties” that provide the economic information. Conversely, neither the five MLPA Program elements in Section 2853(c), nor the eleven Master Plan components in Section 2856(a)(2), address socioeconomics. Socioeconomics, then, is only one factor to consider in the development of a siting alternative (Sections 2855(c)(2), 2857(a)), which still must be consistent with the ecosystem-based goals and elements (Section 2853) and sound scientific guidelines (Section 2857(c)) of the MLPA. Consistent with CEQA Guidelines (14 C.C.R. §15131(a)), there is no duty to mitigate for adverse socioeconomic impacts under the MLPA. The MLPA expressly addresses mitigation of adverse impacts “on marine life and habitat in MPAs,” and if the Legislature had intended that socioeconomic impacts also be mitigated, it plainly would have said so (Section 2862). However, detailed socioeconomic information generated during the siting process may be relevant in the subsequent implementation of regulations under the *Administrative Procedures Act*.

#### **2.2.4. Master Response 4.0—Failure to Consider Existing Marine Protected Areas**

There is no authority for the proposition that the MLPA requires holistic understanding of the resource contributions of existing MPAs before new ones may be considered. Indeed, such a conclusion is precluded by a plain reading of the statute. The MLPA only contemplates "an analysis of the state's current MPAs, based on the preferred siting alternative, and recommendations as to whether any specific MPAs should be consolidated, expanded, abolished, reclassified, or managed differently so that, taken as a group, the MPAs best achieve the goals of Section 2853 and conform to the guidelines in subdivision (c) of Section 2857." (Section 2856(a)(2)(F)). This indicates that the assessment of existing MPAs is driven by the configuration of the preferred siting alternative, not the reverse. That assessment of existing MPAs is intended as part of the ongoing process, as opposed to being a necessary precondition to future MPAs, is further indicated in the Master Plan component requiring "recommendations for monitoring, research, and evaluation in selected areas of the preferred alternative, including existing and long established MPAs, to assist in adaptive management of the MPA network" (Section 2856(a)(2)(H)). Also, the MLPA requires that the Fish and Game Commission "promptly act" on petitions to "add MPAs" and states that "nothing in this chapter" restricts any existing authority to designate new MPAs prior to the completion of the Master Plan." (Section 2861(a), (c)). If a comprehensive assessment of the resource contributions of existing MPAs was required before new MPAs could be created, then these provisions would be rendered null.

#### **2.2.5. Master Response 5.0—Failure to Consider Existing Fishing Management Measures**

The MLPA expressly states that MPAs and fisheries management are complementary. (Section 2851(d)). Similarly, the *Marine Life Management Act* declares that conservation and management programs prevent overfishing, rebuild depressed stocks, ensure conservation, facilitate long term protection and, where feasible, restore marine fishery habitats." (Section 7055(b); see also Section 7056(b), (c)). Although MPAs and fisheries management are complementary, they are not equivalent. The purpose of habitat protection in the MLMA is to advance the "primary fishery management goal" of sustainability (Section 7056). Moreover, that which is being managed is a specific fishery—which may be based on geographical, scientific, technical, recreational and economic characteristics (Section 94)—and so may only provide limited protection of a particular habitat.

Conversely, although the MLPA considers fishery habitat (Section 2851(c), (d)), it also encompasses broader, ecosystem-based objectives that are not limited to *only* fishery management. If only existing fishery conservation and management measures were considered in designing the MLPA networks, then arguably only some of the ecosystem goals and objectives might be met. Other goals and elements would be undervalued (e.g. improving "recreational, educational and study opportunities provided by marine ecosystems" and protecting "marine natural heritage...for their intrinsic value." (Section 2853(b)). The MLPA also states that one of the purposes of the marine

reserve component is to generate baseline data that allows the quantification of the efficacy of fishery management practices outside the reserve (Section 2851(e), (f)). This would be difficult to implement if the MPA design itself must consider those very same existing conservation and management measures.

Moreover, it is important to remember that the MLMA is the most comprehensive revision of state marine fishery management procedures in history. The subsequent enactment of the MLPA the following year strongly suggests the Legislature recognized that fishery conservation and management measures alone were inadequate to the task of broad ecosystem protection. Finally, had the Legislature intended existing fishery conservation and management measures to be considered in designing MPAs, then it plainly would have said so, as it did in the MLMA. (Section 7083). As it is, the fact that the MLPA allows the Commission to "regulate commercial and recreational fishing and any other taking of marine species in MPAs" (Section 2860(a)) strongly suggests that fishery measures are not intended to be considered in the design of MPAs but may in fact be subject to limitations beyond those already existing under fishery management regimes. In particular, the Nearshore Fisheries Management Plan (NFMP) developed pursuant to MLMA is specifically designed to adapt management in the presence of MPAs. Similarly, other fishery management changes, if necessary, would occur after the implementation off MPAs through the MLMA process. Thus, while the design of fishery management measures should properly consider the existence of MPAs, the reverse is not true.

The conclusion that existing fishery management measures are not properly considered in designing MPAs are further bolstered by three "real world" considerations. First, the direction from the Legislature is to use "the best readily available information" and studying the interaction of existing fishery management practices would add another dimension of complexity that retards, not facilitates, the process (See Theme 1.0). Second, the subject of interaction with existing fishery management processes reflects exactly the kind of "scientific uncertainty" acknowledged by the Legislature when it authorized the application of adaptive management to the MLPA process (See Theme 2.0). Third, the unfortunate reality is that existing fishery management processes do not always work. Indeed, as evidenced by the disastrous collapse of the west coast groundfish and the red abalone fisheries, they can fail entirely. Fishery conservation and management measures alone do not necessarily guarantee either fishery sustainability or ecosystem health.

Nevertheless, to the extent practicable, information on existing fisheries management measures was considered in the development of siting alternatives. Presentations were made by Department and federal fisheries management experts, data on the locations and types of existing measures were provided, and changes were made to various proposals in response to comments on other ongoing management. The fact that the final siting alternatives overlap significantly with existing fisheries closures is one indication of the efforts taken to prevent duplication of protection while still meeting the MLPA goals described above.





**From:** Steve Black [steveblack11@cox.net]  
**Sent:** Sunday, December 03, 2006 4:37 PM  
**To:** mlpacomments@dfg.ca.gov  
**Cc:** Steve  
**Subject:** MLPA CEQA COMMENTS

My name is Steve Black, I am writing to you from San Diego, California, I am Executive chef for the Sheraton San Diego Hotel & Marina and I am a private fisherman concerned with the possible direction the upcoming MLPA movement could put me in the future. As a chef for a large convention hotel, I am very sensitive to the seafood that I list on our menus. I have been a private fisherman starting since my days back in Boston in 1985 and understand very well the state of most American and world fisheries these days as it is a very interesting subject to me. With the exception of a few requests that are particularly for Chilean Seabass, all of the fish on my menus are environmentally friendly. Farm raised Salmon, Alaskan Halibut, Pacific Swordfish (this is questionable), Mahi Mahi, farm raised Shrimp and Crabmeat are the most common and popular fish selections in our outlets and primarily in Banquets where we use quite a bit of seafood.

I have seen how our fisheries, locally and worldwide, have become less abundant and more of a precious resource in my brief 11 years as a fisherman and am completely in agreement to start up the MLPA's, but I have a few concerns. First I would like to see the private group of fishermen separated from the Commercial group as it relates to future rights to fish in an MLPA. While the private group of fishermen surely have an affect on each of our fishery resources, I feel it is the Commercial group that has done the most damage all along. A private boat, with a few rods, reels and hooks does not do the indiscriminant damage that a commercial boat does.

With their sophisticated vessels, electronics, gear and techniques, the commercial fisherman have decimated fisheries along every coast line of the United States. From abundant schools of baitfish all the way up to the regal Bluefin Tuna, Swordfish, Marlin and large Groupers. if it swims and they can make money, they will fish for it regardless of what dies along with their targeted species. And with the commercial fishermen having done the majority of the damage, I feel it would only be fair to have them pay the sacrifice that it will take to help get our fish stocks back where they all should be. I am hopeful that when the MLPA's go into effect, that it will completely exclude the Commercial group of fishermen from entering them and leave us private guys to still be able to fish our prime coastal areas, with newly defined severe size and bag limits. The current bag limits that are in affect today are much too generous. Let's face it, who needs to keep 10 Calico Bass? Who needs to keep 10 Yellowtail or 5 Halibut? And even worse is the complete lack of responsibility to still have some fish not fall under ANY size or bag limit. What moron needs to keep a whole boatload of Albacore? You get my point. Ask any private fisherman and I would bet that if given a choice, he would vote for still being able to fish in an MLPA zone to only be able to fill a limit of 2 or 3 Calico Bass and 2 Yellowtail rather than be thrown out of any given area or off of the water completely. As for the commercial fishermen who are shut off and cry foul, that is where government subsidation comes into play as their part in helping to rebuild the parts of the world's oceans that we at least have control over. I say tough luck to the Commercial guys as it is their greed that has put them in their current position. Look at George's Bank a good 10 years after severe restrictions have been put in place it still does not have enough spawning size codfish and so the noble Atlantic Codfish continues to struggle to get back to acceptable stock levels. Do you think that was done by the private guys fishing with a single rod and reel? At least their neighbors, the Atlantic Striped Bass have faired better after tight restrictions.

So please think of who has put us here where we are today and please hand out the "punishment", level of ownership and responsibility that is relative to the answer of that question to the group responsible. If I can help clarify or answer any questions you may have, please feel free to contact me at any time at the following addresses.

Respectfully, Steve Black

A-1

Steve Black  
4787 51st Street  
San Diego, Ca.  
92115

Work-619-692-2238  
Cell-619-666-3858  
steve.black@sheraton.com

**Response to Letter A, from Steve Black**

**Response to Comment A-1:** The proposed MLPA MPA component does include areas, State Marine Parks that exclude commercial take while allowing recreational take. It is generally true that commercial fishermen take the majority of all fish species combined by weight. This fact, however, does not hold true for individual species. In particular, recreational anglers take the majority of many nearshore species and do have an impact on resources. While marine protected areas will help sustain fish species and populations, the primary goal of the MLPA is not fisheries management. Rather the MLPA seeks to represent and replicate a variety of habitats within a network of scientifically designed protected areas. See also Master Response 1.0.

*No changes to the DEIR are required.*

**Subject:** FW: MLPA\_StrgCmte: Fwd: MLPAComments: Stop global warming - Don't Adopt MLPA

From: Bill Richmond [Bll\_Rchmnd@yahoo.com]  
Sent: Tuesday, December 05, 2006 8:27 AM  
To: mlpacomments@resources.ca.gov; fgc@fgc.ca.gov; Melissa Miller-Henson;  
refish@earthlink.net  
Subject: MLPAComments: Stop global warming - Don't Adopt MLPA

Dear Commissioners,

I am writing to ask you to think about what you are doing with the MLPA and not to vote for it.

The Governor has been on us in the auto industry to lower emissions and greenhouse gasses from cars. To lower the amount of fuel we consume and the amount of pollutants into the sky, we need to drive less often and go shorter distances.

With the MLPA, you are making us do just the opposite. It will have the effect of increasing pollution by shutting so many areas down. The increased air pollution will lead to increases in global warming. How can you vote for a plan that makes more emissions? You are making me, and every other fisherman, drive much much further on boats and in cars that pollute just to get to areas we still can fish. That is stupid when I can catch the same fish a lot closer. Is the MLPA more important to Californians than global warming? I dont think so and I doubt the governor thinks so either.

Did anyone analyze the environmental impact of this part of your MLPA process? Or the cost of extra fuel? I did not read anywhere in your papers that the MLPA looked at this and it a huge oversight in your analysis. I request that you provide a full accounting of additional gas that will be burned by closing 25 percent of the coast and what the governor thinks of that. The MLPA is only making people expend needless amounts of fossil fuels getting to further distances.

With gas prices as they are, the Department and Commission should be sincere to the goal of curbing emissions and stop the MLPA. Keep all the coast open to fishing. Thank you.

Bill Richmond  
Culver City

\_\_\_\_\_  
Everyone is raving about the all-new Yahoo! Mail beta.  
<[http://us.rd.yahoo.com/evt=42297/\\*http://advision.webevents.yahoo.com/m](http://us.rd.yahoo.com/evt=42297/*http://advision.webevents.yahoo.com/mailbeta)  
ailbeta>

B-1

**Response to Letter B, from Bill Richmond**

**Response to Comment B-1:** The potential impact of increased emissions from vessel traffic on air quality is discussed in Section 5.1 of the DEIR. The EIR makes conservative assumptions regarding the extent of additional vessel transit, as well as using very conservative significance thresholds, resulting in a conclusion of a significant and unavoidable impact. It is likely that this conclusion is an overestimate. It is impossible to determine whether vessels will travel further to fish in areas beyond an MPA or, conversely, whether they will travel less far and fish nearer to port, reducing emissions. Fuel consumption and added costs of gasoline are not appropriate for CEQA analysis.

*No changes to the DEIR are required.*

**A Case for No Take Zones**

To Whom It May Concern:

I am writing in regards to the MLPA program of proposed marine reserves and recent CEQA documents made available for public comment.

I am first and foremost a lover of the ocean. I am an avid fisherman, but I also appreciate the ocean in many other ways, including surfing and diving. I have worked in the past in commercial fishing. I have a long family history of commercial fishermen. I have Bachelor's and Master's degrees from UC Santa Barbara in aquatic biology. I no longer work in these fields, but instead spend long hours working in hospitals. I look forward to the times when I can go fishing way more than I ever used to. Fishing means the world to me. I mention these things so you know where I am coming from.

I have been observing the MLPA process for years. I have a pretty good understanding of the current state of the process, and as well, the current state of California's marine environments including the health of its fisheries. I know that many of our state's marine resources are depleted to unprecedented levels. Others are less depleted. I would summarize the goals of the MLPA as "conservation, sustainable use, and restoration of our marine resources", put simply. At the same time, the goal is to "minimize[e] adverse socioeconomic impacts" as it is implemented.

I support the concept of having a combination of reserves, parks, and conservation areas, so that there are areas that are essentially pristine and untouched (reserves), as well other areas which allow fishing. I think that No-Take areas which allow recreational fishing are a really important component to this whole process. As such, they would not conflict with the goals set out by the MLPA regarding conservation and restoration, but at the same time also are compatible with its goal of minimizing adverse economic impacts.

As you are no doubt aware, sportfishing is a big deal economically throughout coastal California. Fishing licenses, fishing gear, boats, lodging, etc. are all a part of it. The more areas that become "off limits" to fishing the fewer people will be out there fishing. This will affect a lot of people in a lot of ways from an economic standpoint. Further, more off-limits areas will mean more fishermen will be confined to specific areas – increasing fishing pressure there.

I feel that we should be encouraging fishing, not discouraging it. But by that I do not equate "fishing" with "taking". Clearly, everyone on all sides of this issue must compromise for the good of the resources. Everyone, including fishermen, wants healthy marine ecosystems. On the part of the fishermen, they (we) need to start thinking differently about fishing. In our father's/grandfather's time it was about going out and harvesting a bunch of fish. Those days are over.

Please strongly consider the importance of No-Take areas in this process. For every one fisherman that actually takes the time to put his/her concerns in writing, there are thousands of others out there that feel the same. Please remember that fishing does not always mean harvesting. Encouraging a broader system of catch and release fishing is the best way for us to allow people to fish and at the same time help restore our depleted marine resources for the benefit of current and future generations.

Sincerely,

Paul L. Douglas, MD  
2283 9<sup>th</sup> Ave.  
San Francisco, CA 94116  
(415)681-7159

C-1

**Response to Letter C, from Paul Douglas**

**Response to Comment C-1:** Comment noted. While catch and release fishing may work in some cases, it does not always provide the same benefits as a no-take area. In any fishing, there will always be incidental mortality, leading to ecosystem effects. Additionally, for many marine species, catch and release fishing leads to high direct mortality due to catch stress and trauma from pressure change when bringing fish to the surface. The MLPA is not specifically a fisheries management-based statute. See Master Responses 1.0 and 5.0. Rather, it focuses on including a variety of habitats in scientifically designed protected areas. Also, economic impact is not appropriate for CEQA analysis. See Master Response 3.0.

*No changes to the DEIR are required.*

## Letter D

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

ARNOLD D. SCHWARZENEGGER, Governor

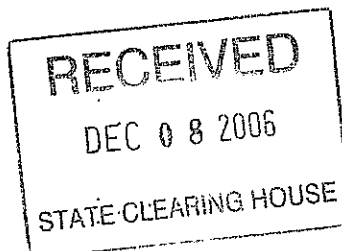
### DEPARTMENT OF TRANSPORTATION

111 GRAND AVENUE  
P. O. BOX 23660  
OAKLAND, CA 94623-0660  
PHONE (510) 286-5505  
FAX (510) 286-5559  
TTY (800) 735-2929



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December 8, 2006



SMGEN044  
SCH#2006072060

Mr. John Ugoretz  
Fish & Game Commission  
1416 Ninth Street  
Sacramento, CA 95801

Clear  
1-2-07  
e

Dear Mr. Ugoretz:

### MARINE PROTECTED AREAS – DRAFT ENVIRONMENTAL IMPACT REPORT

Thank you for including the California Department of Transportation (Department) in the CEQA process for the Marine Protected Areas project. The following comments are based on the Draft Environmental Impact Report (DEIR).

#### Lead Agency

As lead agency, California Fish & Game Commission is responsible for all project mitigation. The project's fair share contribution, financing, scheduling, implementation responsibilities and lead agency monitoring should be fully discussed for all proposed mitigation measures. Since an encroachment permit is required for traffic control and construction work in State Right of Way (ROW), and the Department will not issue a permit until our concerns are adequately addressed, we strongly recommend that the Commission work with both the applicant and the Department to ensure that our concerns are resolved during the CEQA process, and in any case prior to submittal of a permit application. Further comments will be provided during the encroachment permit process; see the end of this letter for more information regarding encroachment permits.

D-1

#### Encroachment Permit

Traffic control and construction work that encroaches onto the State ROW requires an encroachment permit that is issued by the Department. To apply, a completed encroachment permit application, environmental documentation, and five (5) sets of plans clearly indicating State ROW must be submitted to the address below. Traffic-related mitigation measures should be incorporated into the construction plans during the encroachment permit process. See the website link below for more information.

<http://www.dot.ca.gov/hq/traffops/developserv/permits/>

Rudy Dantes, Permits Branch Chief  
California DOT, District 4  
P.O. Box 23660  
Oakland, CA 94623-0660



Mr. John Ugoretz  
December 8, 2006  
Page 2

Please feel free to call or email Patricia Maurice of my staff at (510) 622-1644 or [patricia\\_maurice@dot.ca.gov](mailto:patricia_maurice@dot.ca.gov) with any questions regarding this letter.

Sincerely,

A handwritten signature in cursive script that reads "Timothy C. Sable".

TIMOTHY C. SABLE  
District Branch Chief  
IGR/CEQA

c: Ms. Terry Roberts, State Clearinghouse

**Response to Letter D, from California Department of Transportation, District 4**

**Response to Comment D-1:** The Proposed Project does not include any construction of any type and will not impact traffic patterns or require an encroachment permit.

*No changes to the DEIR are required.*

# Letter E

**Jeff Thomas**

**From:** Melissa Miller-Henson [melissa@resources.ca.gov]  
**Sent:** Wednesday, December 13, 2006 5:01 PM  
**To:** mlpacomments@dfg.ca.gov  
**Cc:** mlpa\_strgcmte@resources.ca.gov  
**Subject:** Fwd: MLPAComments: CEQA document

**From:** Tom Hafer [somethingsfishy@charter.net]  
**Sent:** Wednesday, December 13, 2006 4:41 PM  
**To:** MLPAComments@resources.ca.gov  
**Subject:** MLPAComments: CEQA document

The CEQA document is a regurgitation of the central core people driving this project. The conclusions in this were preconceived with no true discussion of the impacts of this project. They have one page of concerns that are not expanded upon. All of these concerns are very important for the success of this project but these people do not want to deal with them. This project is so political now, that anyone that puts any roadblock in would probably be fired.

E-1

The public came up with justifiable concerns, that need more than 1 page of recognition. The Proposed Package was picked as "environmentally superior". Now why is CEQA making that decision? Maybe if they seriously looked into the concerns of the true stakeholders they would change their minds.

E-2

The Proposed Package is taking all of the best fishing reefs on the Central Coast. They are leaving us the smallest reefs and the sand. They are taking most of the fishing areas close to port, requiring fisherman to go farther in more hazardous conditions, but under hazards you say NI.

E-3

They are displacing fisherman and so they are unable to spatially distribute their effort, resulting in the potential for severe impact to the small reefs left to fish, but under biological resources you say B. The socioeconomic studies in this project did not even include the recreational sport fisherman. They also did not discuss the loss of cultural heritage. These areas they are taking, like Pt. Sur, Piedras Blancas, Pt Buchon, and Purisma have been crucially important to the local fishing community for ages, going back to the Chumash Indians and the Abalone fisherman, but in your report you say under culture NI.

E-4

E-5

They also had other big gaps in information that should have been required before "OKing" this project, for instance baseline spatial abundance studies and habitat mapping that have been simply dropped as unimportant when most scientist feel it is crucial for valid research.

E-6

Concerns regarding funding haven't been looked at. The long term costs are estimated for just the Central Coast to be over 13 million dollars a year. They have inadequate funds dedicated to this for the long term. Isn't that part of CEQA to insure there is proper funding for a project?

E-7

Does it matter that there is an Alternative that had unanimous Stakeholder support by the fishing community, harbor depts, and by the local government that would have been easier to enforce with their support and the fact that most of the Package 1 reserves were designed near areas easy to monitor from the shoreline like JFB and Alder Creek, not like the proposed projects reserves that are very difficult to observe from the road for instance Pt Sur and Piedras Blancas. This will require the state to spend more money on unpopular "spy devices" on everyones fishing vessels.

E-8

Sure package 1 didn't take as much as the others but why do we need more? We don't even know if these are going to work? They may just be a playground for dominate species to eat up the smaller rockfish. We don't know. The presence of humans has been here for hundreds of years. Taking them out, is also an unknown impact.

E-9

Tom and Sheri Hafer

**Response to Letter E, from Tom and Sheri Hafer**

**Response to Comment E-1:** The Proposed Project is the result of more than 5 years of planning efforts and, particularly, the work of a comprehensive stakeholder involvement process, considering a wide variety of public concerns. These concerns, where relevant to CEQA, were also considered in the impact analysis.

*No changes to the DEIR are required.*

**Response to Comment E-2:** Alternative 2, rather than the Proposed Project, is identified as the environmentally superior alternative under CEQA.

*No changes to the DEIR are required.*

**Response to Comment E-3:** While many rocky reef areas are included within the Proposed Project, examination of existing fishing effort from both the commercial and recreational fisheries show that many preferred locations will remain open to fishing. Additionally, specific consideration was taken with regards to distance from port and ability of vessels to fish in areas protected from the weather. Oceanic hazards are addressed in Section 7.6 of the DEIR. Rather than making a conclusion of "NI," the EIR concluded that oceanic hazards were less-than-significant.

*No changes to the DEIR are required.*

**Response to Comment E-4:** As discussed in Chapter 6 of the DEIR, it is not expected that displaced effort will lead to significant adverse environmental impacts.

*No changes to the DEIR are required.*

**Response to Comment E-5:** Effects of the project on cultural resources are described in detail in Chapter 7 of the DEIR. No impacts to cultural resources have been identified.

*No changes to the DEIR are required.*

**Response to Comment E-6:** The information used to prepare the DEIR was adequate for the purposes of making a determination of project impacts; no gaps in information have been identified that preclude impact analysis.

*No changes to the DEIR are required.*

**Response to Comment E-7:** Project funding is not an appropriate topic for CEQA analysis. In any case, that the MLPA contemplates a Master Plan with alternative MPA networks, but expressly only requires *recommendations* for funding shows that funding is not a prerequisite to project approval [See subsections 2856(a)(2)(D) and (K)].

*No changes to the DEIR are required.*

**Response to Comment E-8:** Because Alternative 1 falls short meeting the MLPA intent for a cohesive biological network and Alternative 2 contains elements that are difficult or unrealistic to enforce and implement, the Proposed Project is the most likely to achieve the full range of MLPA goals and objectives, and has therefore been identified as the Commission preferred alternative. There is no indication that any alternative has unanimous support of the fishing community.

*No changes to the DEIR are required.*

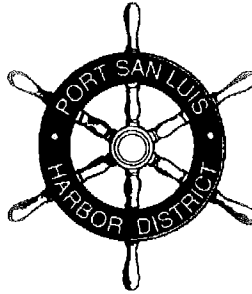
**Response to Comment E-9:** In existing MPAs, it has been shown that larger predators do not consume all the smaller fish and that ecological balance is maintained [Mumby et al., 2006]. In California MPAs, studies show increases in previously fished species inside MPAs while unfished species abundance does not change with respect to areas outside (Tetreault and Ambrose, 2006).

*No changes to the DEIR are required.*

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PHILLIP J. SEXTON, CPA

*Harbor Manager*  
*Legal Counsel*  
*Treasurer*

**Letter F**

December 18, 2006

John Ugoretz  
Nearshore Ecosystem / MLPA Coordinator  
California Department of Fish and Game  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

**IN RE: COMMENTS TO DRAFT EIR FOR CENTRAL COAST MLPA PROJECTS**

Dear John,

Thanks for asking for input regarding the Draft EIR for the Central Coast MLPA Projects.

Port San Luis Harbor District would like the Department of Fish and Game to consider the following as it takes steps to finalize the EIR and implement the MLPA projects for the Central Coast area:

**First**, the Draft EIR contains a letter from Jay Elder, Harbor Manager, dated August 9, 2006. Respectfully, I reassert the 18 issues he raises in his letter again without repeating them here.

**Second**, Section 7.3., Public Services and Utilities, pages 7.20 to 7.27

The Draft EIR analysis is flawed and a corrected analysis will show "Potentially Significant Impact" to a number of public facilities at the ports and harbors within the study area.

- Appendix G of the State CEQA Guidelines correctly states the topics and the criteria for analysis.
- The Draft EIR only focuses on Emergency Response Services.
- What about impact to parks and "other public facilities"?
- The Draft EIR process can't choose the easy topics and gloss over the difficult topics of parks and other public facilities.

F-1

- Nor does the Draft EIR deal with the cumulative impacts of fishing regulations and the role MPA would have on public facilities.

F-1  
Continued**Third, Section 7.4, Recreation, Pages 7.28 to 7.42**

The Draft EIR analysis is flawed and a corrected analysis will show “Potentially Significant Impact” to recreational fishing.

- Appendix G of the State CEQA Guidelines correctly states the topics and the criteria for analysis.
- The Draft EIR does not analyze the impacts to recreational fishing in the 18 pages of discussion.
- Nor does the Draft EIR deal with the cumulative impacts of fishing regulations and the role MPA would have on recreational fishing.

F-2

**Fourth, Section 8.4.5.8, Cumulative Impacts, Public Services, Page 8.7**

The Draft EIR analysis is flawed and a corrected analysis will show “Potentially Significant Impact” regarding cumulative impacts to public services and facilities.

- Appendix G of the State CEQA Guidelines correctly states the topics and the criteria for analysis.
- The Draft EIR picks and chooses some topics, but does not consider all the topics required in Appendix G of the State CEQA Guidelines.
- If two or more harbors within the study area have “Potentially Significant Impacts” from the implementation of the Preferred Alternative, shouldn’t that establish a de-facto proof of a cumulative impact?
- The Draft EIR does not analyze cumulative impacts to public services or the deterioration of public facilities.

F-3

**Fifth, Section 8.4.5.9, Cumulative Impacts, Recreation, Page 8.7**

The Draft EIR analysis is flawed and a corrected analysis will show “Potentially Significant Impact” regarding cumulative impacts to recreational fishing and recreational fishing facilities.

F-4

Comments - DRAFT EIR -- Central Coast MLPA  
Port San Luis Harbor District

3

- Appendix G of the State CEQA Guidelines correctly states the topics and the criteria for analysis.
- The Draft EIR does not analyze cumulative impacts to recreational fishing.
- The Draft EIR states on page 8.7:

"The Proposed Project would neither cause substantial physical deterioration of coastal waters or other recreational facilities to occur or be accelerated . . . "

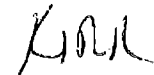
This statement ignores reality, economies of scale that recreational fishing provides to public facilities, and the cumulative impacts the Proposed Project would have on recreational facilities within the study area.

F-4  
Continued

Respectfully I request that the Final EIR be improved to address the issues mentioned above.

Thank you.

Sincerely,



Kirk Sturm  
Harbor Manager

KS: lp

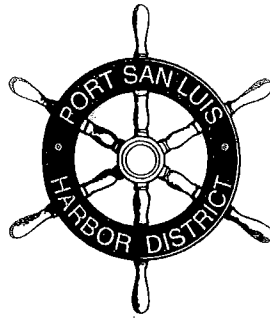
cc: Harbor Commissioners, Port San Luis Harbor District  
Rick Algert, Morro Bay Harbor  
Steve Scheiblaue, Monterey Harbor  
Linda McIntyre, Moss Landing  
Brian Foss, Santa Cruz Harbor  
Peter Grenell, San Mateo Harbor District (Pillar Point Harbor)



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PHILLIP J. SEXTON, CPA

*Harbor Manager*  
*Legal Counsel*  
*Treasurer*

## Letter F Attachment

August 9, 2006

MLPA CEQA Scoping Comments

c/o John Ugoretz, Nearshore Ecosystem Coordinator  
Dept. of Fish and Game – Marine Region  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

Re: MLPA Scoping Comments

Dear Mr. Ugoretz:

Thank you for allowing the Port San Luis Harbor District to submit Scoping Comments for the Environmental Review of the Marine Life Protection Act Initiative. This Project is to consider possible Marine Protected Areas on the Central Coast of California between Pigeon Pt. and Pt. Conception. The California Fish and Game Commission is acting as Lead Agency.

Along with proposed Marine Protected Areas (MPA's), a set of proposed regulations is also being considered. The Project's objectives are "to help protect, maintain, restore, enhance and manage living marine resources." We wish to offer our views on what should be analyzed in the Environmental Review of the proposed MLPA Project. The attached Scoping Comments are submitted for your review and consideration.

Thank you.

Sincerely,

Jay K. Elder  
Harbor Manager

JKE: lp

Attachment: Scoping Comments – MLPA Project



August 9, 2006  
Port San Luis Harbor District

### Scoping Comments – MLPA Project

- |  |      |
|--|------|
| 1. Explain the “CEQA equivalent” process and law for the Department of Fish and Game as it applies to this Project. Include timeline, technical and statutory requirements leading up to final action by the Fish and Game Commission.   | F-5  |
| 2. Does the Marine Life Protection Act (MLPA, Stats. 1999, Ch. 1015) “ <u>require</u> ” Marine Protected Areas, as stated in the July 11, 2006 Department of Fish and Game Notice of Preparation for this Project?   | F-6  |
| 3. Include in the “Alternatives” section of the draft environmental document a No Action (no Marine Protected Areas) discussion and analysis. Include a discussion that the MLPA law does not require adoption, only consideration of MPA’s by the Fish and Game Commission (if the answer to #2 above is No).   | F-7  |
| 4. The stated Project objectives are “to help protect, maintain, restore, enhance and manage living marine resources” by developing a network of Marine Protected Areas. Please include in this study the effects of marine mammals, specifically sea otters and sea lions and their influence and impacts to the stated goals. Also include an analysis of human harvest of other apex predators, such as lingcod, and the effects and benefits of such harvests compared with stated Project goals and objectives. | F-8  |
| 5. Consider as a mitigation measure a change in the Fish and Game code to allow white sea bass gill net fishing to re-occur in Subregion Area 7 (Santa Maria River to Pt. Conception) to offset the impacts of the proposed Marine Protected Area (restore to historic depths in shallower waters).  | F-9  |
| 6. Consider and analyze the safety of fishing vessels and crew in having to fish areas that may be further from points of departure, and as a result of Project, smaller areas of fishing grounds, creating a higher density of vessels (i.e., collisions, etc.) in remaining fishing zones. Are there or will there be air pollution impacts due to longer running times?   | F-10 |
| 7. What are the environmental effects of crowding the existing number of fishing boats into a smaller area of fishing grounds?   | F-11 |
| 8. Does the current Project as defined by CEQA meet the detailed description for a marine ecosystem (which shall include all influences upon such systems)? Please analyze the marine ecosystem as a total biological community and not just selected creatures/species.   | F-12 |
| 9. Consider and create a comparison matrix of proposed regulations for Marine Protected Areas (MPA’s), current Fish and Game regulations, and past regulations and closures (since 1995). Then provide an in-depth analysis on how the past regulations relate to this Project’s goals and objectives, and if the past regulations and closures (seasonal quota  | F-13 |

limits/reductions and Rockfish Conservation Zone – RCZ) have been effective in “maintaining, restoring and enhancing” the marine resource.

10. Do a comparison and analysis on the Project’s proposed closures and any conflicts with other State laws, such as the California Coastal Act, etc. (Land Use impacts). F-14

11. With the proposed closures of a percentage of the State waters to coastal dependent and related activities (recreational and commercial fishing), a loss of opportunity is established, thus requiring mitigation measures for those losses. Please identify appropriate and sufficient mitigations for the loss of these marine related (and existing) uses. F-15

12. The reduction of marine access, including recreational and commercial fishing enterprises, will have an impact on the coastal communities’ land use and planning policies / ordinances (State, County and locally). Provide an analysis on the effects of the change in Use patterns due to the Project, and what effects it will have on the adopted Land Use Plans for coastal communities whose infrastructure, economy and existence count on coastal access, recreation and commercial fishing activities. F-16

13. Fishermen, both sport and commercial, are main social and cultural contributors to coastal communities. This heritage is a vital part of the historic waterfront community. This Environmental Review should study and mitigate any impacts in the change of coastal culture and fishing heritage due to the Project. F-17

14. Regarding increased or decreased public services, the effects of the Project on local government (ports, marinas and harbors) and specifically Fish and Game monitoring and enforcement should be studied and discussed in detail. F-18

15. The consultant (and Fish and Game) should consider earlier analyses, and the best available science, on all elements of this Project, including historical catch data, economic benefits of the fisheries industry, and recently published scientific data regarding the health of the ecosystem in the Project areas (Big Creek, CFC Peer Review, Cal Poly – San Luis Obispo, etc.). F-19

16. The Project must be described in full and must take into account the whole “action” involved, that is, apply the “objectives” to the entire ecosystem in the study area per the requirements of CEQA. F-20

17. Cumulative effects of all aspects of the proposed Project should include the issues listed above. F-21

18. Conduct a complete review and analysis of the ability to perform (monitor, enforce, etc.) the Project in all Subregions, with a focus on the Southern part of the study area – Vandenberg Zone. The analysis should include the Air Force’s stated policy (position) and environmental statement (NEPA) for any change that may occur due to new or expanded Marine Protected Areas. Discuss methods of access for the purpose of monitoring, managing and enforcement, and whether any restrictions would invalidate the stated goals and objectives of the Project. F-22

## Response to Letter F, from Port San Luis Harbor District

**Response to Comment F-1:** The significance criteria in the DEIR are founded upon those found in Appendix G of the CEQA Guidelines, and the DEIR selects the appropriate topics and criteria for analysis. Section 7.4 of the DEIR (beginning on page 7-28) addresses the Proposed Project's effects on recreational facilities. Specifically, Impact REC-1 addresses the potential for physical deterioration of recreational facilities, concluding that there is no significant impact. The potential for significant physical impacts to other public facilities as a result of the project is speculative, and the commenter does not provide any evidence to substantiate such a claim. The DEIR analysis is not flawed and conforms to the legal requirements of CEQA.

Please refer to Section 8.4 of the DEIR for a discussion of cumulative impacts. In particular, existing fishing regulations were considered to be part of the baseline conditions for the Proposed Project and was analyzed as such. Please refer to the discussion above regarding the role the Proposed Project would have on public facilities.

*No changes to the DEIR are required.*

**Response to Comment F-2:** The significance criteria in the DEIR are founded upon those found in Appendix G of the CEQA Guidelines, and the DEIR selects the appropriate topics and criteria for analysis. Impact REC-2 (beginning on page 7-41 of the DEIR) specifically addresses effects on recreational fishing. Specifically, the DEIR concludes that while some restrictions would be placed on recreational fishing, that many opportunities would remain for recreational fishing, and that the Proposed Project avoids many desired recreational fishing locations. The DEIR concludes that impacts to recreational fishing are less than significant. The DEIR analysis is not flawed and conforms to the legal requirements of CEQA.

Please refer to Section 8.4 of the DEIR for a discussion of cumulative impacts. In particular, existing fishing regulations were considered to be part of the baseline conditions for the Proposed Project and were analyzed as such. Please refer to the discussion above regarding the role the Proposed Project would have on recreational fishing.

*No changes to the DEIR are required.*

**Response to Comment F-3:** The significance criteria in the DEIR are founded upon those found in Appendix G of the CEQA Guidelines, and the DEIR selects the appropriate topics and criteria for analysis. The DEIR concludes that there would not be significant impacts on harbors, and the project would not make a considerable contribution to a cumulative impact on harbors. The commenter does not provide any evidence to support a contrary conclusion. Please refer to Response to Comment F-1 for a discussion of public services and facilities. The DEIR analysis is not flawed and conforms to the legal requirements of CEQA.

*No changes to the DEIR are required.*

**Response to Comment F-4:** The significance criteria in the DEIR are founded upon those found in Appendix G of the CEQA Guidelines, and the EIR selects the appropriate topics and criteria for analysis. The DEIR concludes that there would not be significant impacts on recreational fishing, and the project would not make a considerable contribution to a cumulative impact on recreational fishing. The commenter does not provide any evidence to support an alternate conclusion. The DEIR analysis is not flawed and conforms to the legal requirements of CEQA. Regarding impacts to public facilities, please see earlier responses, and the analysis of number of recreational fishing trips potentially impacted. This low level of impact could not reasonably be seen as leading to a significant or cumulatively significant impact on facilities.

*No changes to the DEIR are required.*

**Response to Comment F-5:** State agencies with activities that include protection of the environment as part of their regulatory program may request certification of their regulatory program from the Secretary for Resources. With certification, an agency may prepare functional equivalent environmental documents in lieu of EIRs or Negative Declarations. The regulatory program of the Commission has been certified by the Secretary for Resources [CEQA Guidelines subsection 15251(b)]. Therefore, the Commission is eligible to submit an Environmental Document in lieu of an EIR (CEQA Guidelines Section 15252). However, in the case of the Proposed Project, the Commission has elected to prepare a full Environmental Impact Report. See pages 1-15 to 1-17 of the DEIR for a description of the CEQA process.

*No changes to the DEIR are required.*

**Response to Comment F-6:** Yes, the MLPA specifically states that the Department shall prepare a Master Plan and the Commission shall adopt a program based on that plan which includes "recommended alternative networks of MPAs, including marine life reserves (now known as state marine reserves) in each biogeographical region..." 2856(a)(2)(H). See Master Response 1.0.

*No changes to the DEIR are required.*

**Response to Comment F-7:** Pursuant to CEQA requirements, the No Project alternative is presented on pages 2-23 through 2-26 of the DEIR, and evaluated in Chapter 9 of the DEIR (specifically, pages 9-4 and 9-5).

*No changes to the DEIR are required.*

**Response to Comment F-8:** The influence of marine mammals, including sea otters and sea lions is described in section 6.1 of the DEIR beginning on page 6-14. Human harvest of apex or top-level predators removes individuals of certain species

from the ecosystem, upsetting the overall balance of the ecosystem and potentially leading to habitat changes (Halpern, Cottenie and Broitman, 2006).

*No changes to the DEIR are required.*

**Response to Comment F-9:** No impacts were identified that would make such mitigation necessary.

*No changes to the DEIR are required.*

**Response to Comment F-10:** Please refer to Impact VT-1 (page 7-56 of the DEIR) and Impact AIR-2 (Page 5-10 of the DEIR) for a discussion of oceanic hazards and air pollution impacts, respectively. The DEIR concluded that ocean hazards resulting from the project would be less-than-significant. With respect to air quality, the DEIR makes conservative assumptions regarding the extent additional vessel transit, as well as using very conservative significance thresholds, resulting in a conclusion of a significant and unavoidable impact. It is likely that this conclusion is an overestimate. It is impossible to determine whether vessels will travel further to fish in areas beyond an MPA or, conversely, whether they will travel less far and fish nearer to port, reducing emissions.

*No changes to the DEIR are required.*

**Response to Comment F-11:** Please see Response to Comment F-10, as well as Impact BIO-1 (page 6-25 of the DEIR), which concluded that concentration of fishing effort, if it were to occur, would have a less-than-significant impact on marine species and habitats. See Master Response 3.0.

*No changes to the DEIR are required.*

**Response to Comment F-12:** By taking a habitat approach, as opposed to single species management, the project takes an ecosystem approach.

*No changes to the DEIR are required.*

**Response to Comment F-13:** The overlap with other fishery management regulations is described in Impact BIO-2 (page 6-28 of the DEIR). The specific in-depth analysis of past regulations that is requested by the commenter is beyond the scope of the CEQA analysis for the current project, and is not required by the MLPA. See Master Response 5.0.

*No changes to the DEIR are required.*

**Response to Comment F-14:** Please refer to page 3-2 of the DEIR for a discussion of Land Use impacts. There have been no conflicts identified. Specifically,

the Proposed Project provides for resource protection and conservation that would be consistent with the natural resource protection goals of the California Coastal Act.

*No changes to the DEIR are required.*

**Response to Comment F-15:** Chapter 4 of the DEIR provides an overview of socioeconomic considerations related to commercial and recreational fishing. Economic effects are not required to be analyzed under CEQA; however, economic effects that lead to changes in the physical environment do require analysis, as do changes in recreational opportunities. No significant adverse impacts associated with a “loss of opportunity” were identified that would require mitigation. Specifically, please refer to Impact PH-2 (page 7-19 of the DEIR), which addresses urban decay, and Impact REC-2 (page 7-41 of the DEIR), which addresses recreational opportunities. See Master Response 3.0.

*No changes to the DEIR are required.*

**Response to Comment F-16:** Commenter does not provide evidence of how impacts to coastal communities land use and planning policies or ordinances might occur; the DEIR has concluded that there are no significant impacts in this regard. Please refer to page 3-2 of the DEIR, and the discussion under Impact PH-2.

*No changes to the DEIR are required.*

**Response to Comment F-17:** Commenter does not provide evidence of an impact to the fishing heritage. Conversely, a stated goal of the MLPA is sustainability, which would lead to long-term stability of fishing. No significant adverse impacts are anticipated that would require mitigation. See Master Response 3.0.

*No changes to the DEIR are required.*

**Response to Comment F-18:** Please refer to the discussion provided in Section 7.3 of the DEIR (beginning on page 7-20).

*No changes to the DEIR are required.*

**Response to Comment F-19:** Earlier analysis and the best readily available science were used as relevant and necessary to determine the environmental impacts of the Proposed Project. See Master Response 2.0.

*No changes to the DEIR are required.*

**Response to Comment F-20:** The project, including project objectives, has been described in accordance with the requirements of CEQA Guidelines Section 15124. Please refer to Chapter 2 of the DEIR.

*No changes to the DEIR are required.*

**Response to Comment F-21:** It is unclear what specific issues the comment is referencing. Please refer to Section 8.4 of the DEIR (beginning on page 8-2), which provides a full analysis of cumulative impacts.

*No changes to the DEIR are required.*

**Response to Comment F-22:** Please refer to Section 7.3 of the DEIR for a discussion of monitoring and enforcement. With respect to the Air Force, please see the existing MOU with the Department and the language in proposed regulations for a new MOU between the Department and the Air Force.

*No changes to the DEIR are required.*





## Letter G

December 19, 2006

### RE: MLPA Central Coast CEQA

Dear CDFG and Commission representatives,

We are writing in regards to the Draft Environmental Impact Report for the California Marine Life Protection Act Initiative Central Coast Marine Protected Areas Project. First, we would like to commend you on the effort and accomplishments of the project thus far. We would like to present some comments on the CEQA document, and suggestions for how some adverse environmental impacts may be reduced.

First and foremost, market squid fishing within MPAs would potentially result in both direct and indirect negative environmental impacts associated with the proposed project. Given the importance of squid as a forage resource for both commercially and non-commercially valuable predators, the impacts of squid fishing would be **potentially significant** and likely **cumulative** throughout the food web. **We strongly recommend removing provisions to allow market squid fishing in the Greyhound Rock State Marine Conservation Area (SMCA).**

G-1

As you are well aware, The MLPA identifies a set of goals for the project, including “protecting the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems” (**Goal 1**), as well as “ensuring ... California's MPAs ...are based on sound scientific guidelines” (**Goal 5**). Unfortunately, **fishing for mid-trophic level forage species supporting healthy food web function directly opposes these goals, yet is proposed in several MPAs** for the central California coast region. Specifically, allowing market squid fishing within MPAs would go against **Objective 1.4** (protect natural trophic structure and food webs in representative habitats), **Objective 1.5** (protect ecosystem structure, function, integrity, and ecological processes to facilitate recovery of natural communities from both natural and human-induced disturbances), and **Objective 5.3** (effectively use scientific guidelines in the master plan framework).

G-2

Forage species in central California are a less diverse group (fewer species types) than the predators they support. **Absence or dearth of even one or a few types of forage species may translate into reproductive failure or mortality for predators.** In addition to marine birds and mammals, recreationally and commercially valuable predatory fish populations rely heavily on squid. Thus, allowing squid fishing and/or fishing for other forage species may result in “take” of marine predators that rely on these prey. Specifically, squid fishing may result in the “perturbation of the ecosystem in such a way that it leads to increased mortality of a species”. As stated in the CEQA document, “the indirect effects of extraction of one or more species allowed in SMCAs and SMPs are poorly understood with regard to how other species in the ecosystem are affected (e.g., predators, prey, competitors).” **In general, fishing for forage species is not**

G-3



**good practice.** The *North Pacific Fisheries Management Council*, for example, in acknowledging existing scientific understanding of food web dynamics and attempting ecosystem-based management (EBM), recognizes the importance of prohibiting fishing for forage species.

G-3  
Continued

In addition to market squid, certain other forage species fall under the category of *pelagic finfish* as defined in the CEQA, such as northern anchovy, another important prey species in central California. Such species often have short generation times and high sensitivity to environmental variation. Population fluctuations may therefore be extreme. **Dynamics of many forage species are not well understood, resulting in high risk when attempting a fishery, especially one in the highly variable California Current system which is not regulated in terms of environmental variation** (e.g. squid under the Market Squid Fishery Management Plan). In contrast, managed take of certain predatory fishes (e.g., salmon) under carefully considered circumstances may not pose as great a threat to the overall health of the ecosystem. Overall, a more beneficial strategy when balancing ecological and socio-economic issues is to allow carefully regulated fishing of some predatory fish rather than depleting the forage base.

G-4

Thirdly, it has already been established that important foraging areas for predators occur in the lee of coastal headlands, such as Pt. Año Nuevo, including the area encompassed by Greyhound Rock SMCA. The Año Nuevo SMCA by itself covers only a minor portion of the Pt. Año Nuevo upwelling plume relative to forage opportunities needed for the density of seabirds and marine mammals which inhabit the Año Nuevo area. **Fishing for market squid is effectively “fishing down the food-web,” and this type of fishery can have devastating effects on ecosystem integrity and upper trophic level wildlife.** Thus several MLPA goals are not met if squid fishing is allowed in Greyhound Rock SMCA.

G-5

Finally, **the Greyhound Rock SMCA has the potential to provide significant protection to the marine bird and mammals in this biodiversity hotspot.** Legislation such as the Migratory Bird Treaty Act and the Marine Mammal Protection Act do nothing to protect the forage base for upper trophic predators. In the case of squid, the Market Squid Fishery Management Plan also neglected to take into account the needs of seabirds and marine mammals in the Año Nuevo and Greyhound Rock area. However, both the Marine Life Management Act and Magnuson-Stevens Act specify that the needs of ecologically dependent species must be taken into account when setting fishery quotas and implementing other regulatory actions. Thus, the MLPA process is an appropriate arena to address and provide for these needs. We **do not support the take of squid in the Greyhound Rock SMCA, given that most seabirds and marine mammals which breed in the vicinity of Año Nuevo (and are thus restricted in their foraging range due to the need to continually return to care for young) consume squid as an important part of their diet.**

G-6



In summary,

- **Marine ecosystem health relies on protection of the forage base for the marine food web of which market squid are a major part**
- **The Greyhound Rock area is particularly important source of forage species (especially for breeding marine birds and mammals with restricted ranges) because of its location in a headland shadow and the resulting major upwelling plume**
- **Market squid fishing would likely result in significant negative ecosystem impacts and thus we strongly recommend prohibiting market squid fishing in the Greyhound Rock SMCA;**

We urge the CDFG and the Commission to work to meet the MLPA goals listed above and to fully consider all the scientific input to this process. Thank you very much for the opportunity to comment, and please feel free to contact me with any questions.

Sincerely,

Julie A. Thayer  
Marine Ecologist  
707-781-2555, x317  
jthayer@prbo.org

## Response to Letter G, from PRBO Conservation Science

**Response to Comment G-1:** The project does not allow increased take of market squid and, overall, protects many areas where squid spawn and aggregate. In fact, 11 square miles directly adjacent to the north are completely protected in the Año Nuevo SMR. The Department acknowledges that squid are an important forage resource to both commercially and non-commercially important predators. Market squid are managed as a part of the Federal Coastal Pelagic Species Fishery Management Plan, and the Department's Market Squid Fishery Management Plan. Under the Department's management plan, fisheries control rules which include weekend closures as well as spawning reserve areas, including the proposed central California reserves, are designed to maintain a sustainable resource and create forage reserves and areas of uninterrupted squid spawning. Squid are abundant throughout the study region and data are not available linking fishing for squid to the type of food web impacts claimed.

*No changes to the DEIR are required.*

**Response to Comment G-2:** The MLPA goals are for the entire program and do not necessarily have to be achieved in each individual MPA. There are many MPAs in the proposal that provide for full no-take ecosystem protection in areas where market squid are found. The comment does not provide justification or citations for how the proposal would fail to meet these goals and objectives as a whole. See Master Response 1.0.

*No changes to the DEIR are required.*

**Response to Comment G-3:** The project does not allow increased take of squid or other forage species and, overall, protects many areas where such species spawn and aggregate. Therefore, the impacts that the comment refers to would not occur as a result of the project, and there is no impact under CEQA.

*No changes to the DEIR are required.*

**Response to Comment G-4:** The Proposed Project does not intend to be used as the sole management tool for any species. The Proposed Project addresses habitat and ecosystem concerns, as noted by the commenter in early statements. Fisheries management decisions will include both the effects of the Proposed Project (anticipated to be beneficial) and other management actions as well as status of populations. The project would not result in, nor does the comment show evidence of, depleting the forage base.

*No changes to the DEIR are required.*

**Response to Comment G-5:** Please see previous responses. The comment does not provide evidence to substantiate the statement. The project meets the MLPA goals as a whole.

*No changes to the DEIR are required.*

**Response to Comment G-6:** Comment noted. As stated previously, the Proposed Project neither increases the overall take of market squid, nor does it provide decreased protection for seabirds and marine mammals. To the contrary, the Proposed Project includes many areas in full no-take protection where feeding aggregations of seabirds and marine mammals occur.

*No changes to the DEIR are required.*



## Letter H

December 20, 2006

### RE: MLPA Central Coast CEQA

Dear CDFG and Commission representatives,

We are writing in regards to the Draft Environmental Impact Report for the California Marine Life Protection Act Initiative Central Coast Marine Protected Areas Project. First, we would like to commend you on the effort and accomplishments of the project thus far. We would like to present some additional brief comments on the CEQA document.

- 1) Appendix F - Species To Benefit. This section lacks a list of seabirds or marine mammals which are critical components of marine ecosystems that can benefit from MPA establishment. Not all marine birds and mammals are far-ranging, pelagic species. **Pelagic cormorants, Brandt's cormorants, pigeon guillemots, and harbor seals all have short foraging ranges (<20km) while breeding and all feed heavily on sedentary demersal and benthic species.** These and other predators could benefit significantly from protection of their prey base through MPAs. These species occur in multiple proposed MPAs, including Año Nuevo SMR, Greyhound Rock SMCA, and Vandenberg SMR.

H-1

**Seabirds and marine mammals can also benefit from decreased disturbance resulting from decreased fishing activities within MPAs.** Disturbance can occur both at sea during resting or foraging activities, as well as on the colony when fishing vessels may approach too closely or night-lighting (as from market squid vessels) disorients nocturnal seabirds or exposes them to predators.

- 2) Chapter 6 – Biological Resources, Seabird Colonies. **Rhinoceros Auklet is conspicuously missing from this section.** This California species of special concern breeds in only 3 main locations in the state, one of which is Año Nuevo Island within Año Nuevo SMR.

H-2

Thank you for the opportunity to comment on the MLPA Central Coast CEQA. If you have any questions, please don't hesitate to use the contact information given below.

Sincerely,

Julie A. Thayer  
Marine Ecologist  
707-781-2555, x317  
jthayer@prbo.org

## **Response to Letter H, from PRBO Conservation Science**

**Response to Comment H-1:** Comment noted. The Department appreciates this additional information regarding the benefits of the Proposed Project.

### *Revisions to the DEIR*

Appendix F has been replaced with a more current version that includes seabirds and marine mammals (Refer to Chapter 3 of this Final EIR).

**Response to Comment H-2:** Comment noted. The Department appreciates this additional information regarding the Rhinoceros Auklet. The project is not anticipated to result in adverse impacts to the Auklet, as it does not propose any actions that would directly result in take of the Auklet, or result in reductions in its habitat or forage base. For this reason, no additional analysis of the Auklet is warranted.

*No changes to the DEIR are required.*

**Letter I**

MLPA Central Coast CEQA  
DEPARTMENT OF FISH AND GAME  
Marine Region  
20 Lower Ragsdale Drive, S  
Monterey, California 93940

Regarding the Central Coast MLPA, Cambria SMR:

As an avid kayak fisherman who frequents the proposed Cambria SMR area and I would like to relay the following observations.

From my conversations with both John Ugoretz and fellow fisherman who frequent the Marine Terrace area of proposed Cambria SMR, there has been little scientific support or reliable study of the actual usage by fisherman or location of this site. When I originally contacted John he commented that the local fishing practices that I had described to him was "contrary to what he had heard to date". His descriptions regarding local fishing practices were almost certainly taken from the limited point of view of a person that uses the Leffingwell Landing area several miles to the north. He was completely unaware of the actual fishing activities in the area or the traditional boundaries of the fishing grounds themselves that the proposed Cambria SMR was based on. In addition, I was told that the location of the northern boundary was based solely on what seemed to be a good visible cue for boaters and the comments of one man from a local fishing club. As a boater who has frequented this area I can definitively say that this "visible cue" is pointless, and anyone familiar with the area knows this fact. Fog regularly shrouds the shoreline when even a short distance offshore and the basic concept of a visual cue in this area itself is somewhat senseless as the northern line of the SMR juts out from a rugged coastline at an fairly oblique angle.

I-1



All of this points to a lack of scientific evidence or study and much of this seems simply arbitrary. How could a reliable study be completely unaware of the traditional fishing at the site in question? And how could a boundary location be assigned that ignores the functionality of its intended purpose? Why was the more near shore SMR option chosen when this option could only target the relatively low impact kayak fisherman but have no effect on the big party boats that are frequent in the deeper waters? There can be only one reason; this was a political decision, not one based in science. And definitely not a decision based on any familiarity of the location in question.

I-1  
Continued

Another point regards the impact on fisheries on the now shrinking areas available to fisherman. What are the impacts to the now more concentrated fishing of the areas adjacent to these MPAs?

I-2

The Cambria SMR is a political chip in game that pits busy people like me against well funded lobbyist that have but one political purpose. Please ask questions regarding the scientific premise underlying this specific SMR. I believe you will find as I have, this is a political move masquerading as science.

Thank you for your time. You may reach me with any questions at (805)440-8701 or [info@sandscapes.com](mailto:info@sandscapes.com).

Regards,  
Greg Glenn

## **Response to Letter I, from Greg Glenn**

**Response to Comment I-1:** Comment noted.

*No changes to the DEIR are required.*

**Response to Comment I-2:** See Response to Comments F10 and F11.

*No changes to the DEIR are required.*



## Letter J

December 26, 2006

Mr. John Carlson, Executive Director  
California Fish & Game Commission  
1416 Ninth Street  
Sacramento, CA 95814

Dear Mr. Carlson, members of the Commission, and Department MLPA Staff:

Thank you for this opportunity to comment on the draft EIR and CEQA documents for the Central Coast MLPA network. These comments and questions are focused on the proposed designations within the Morro Bay State and National Estuary.

The preferred alternative would classify over 90% of the Morro Bay Estuary as the Morro Bay State Marine Recreational Management Area (SMRMA). The Morro Bay National Estuary Program (Estuary Program) has a number of serious concerns with this proposed designation, and believes that a State Marine Conservation Area (SMCA) is a more appropriate designation for this nationally significant estuarine system. The draft EIR and CEQA documents do not adequately address our concerns, nor do they explain the underlying rationale for this unusual designation. Our comments and specific questions follow.

A SMRMA is not a Marine Protected Area because it is **not** "primarily intended to protect or conserve marine life and habitat". A SMRMA is a Marine Managed Area focused on recreational uses. A SMRMA is therefore **not** primarily intended to protect or conserve marine life and habitat; should not be considered as part of a network of MPAs, and is not consistent with goals 1 through 4 of the Marine Life Protection Program, each of which include clear language about creating a network of MPAs to protect, sustain, and conserve marine resources.

J-1

The proposed SMRMA would place recreational uses as the primary and underlying management priority for most of Morro Bay. The Morro Bay Estuary provides tremendous recreational opportunities, but it is also widely recognized as encompassing rare and important physical and biological marine resources that warrant recognition and protection through the MLPA process. The significance of these resources has been well documented and supported throughout this Central Coast MLPA process, and is reflected in our status as a State and National Estuary.

J-2

Briefly, the Morro Bay Estuary hosts a diverse array of rare and productive habitats including intertidal mudflats, eelgrass beds, and salt marshes; serves as a nursery and spawning ground for diverse fish species, is habitat for endangered species including tidewater gobies, southern steelhead trout, peregrine falcons, and the black rail among others, and is an important stop on the Pacific Flyway recognized as an Important Bird Area because of the incredible diversity and abundance of bird species found in and around the estuary. It is one of only two significant estuaries in the Study Region.

In recognition of these significant resources, and the threats facing them, Morro Bay was nominated by the Governor of California and accepted by the Administrator of the U.S. Environmental Protection Agency as one of only 28 Estuaries in the National Estuary Program (NEP). Through the Estuary Program, a Comprehensive Conservation and Management Plan to protect and restore the resources of Morro Bay was developed with broad participation and input from agencies and local stakeholders, including the Department of Fish and Game, and the Morro Bay National Estuary Program is working actively to implement that plan. Recreational resources are recognized as an important component of the estuary in this plan, but Morro Bay warrants a designation that recognizes more than just the recreational value of the estuary.

J-3

The draft CEQA/EIR documents includes language suggesting the SMRMA designation would be consistent with the longstanding waterfowl hunting activities that continue in portions of the Estuary. There is no explanation of why waterfowl hunting, appropriately managed by the Department, would conflict with an SMCA designation. It is not clear in the documents whether waterfowl are 'marine resources' under the purview of any MPA or MMA designation in the first place. If they are, the SMCA designation clearly allows the Commission and Department significant leeway to allow or restrict specific recreational and commercial uses, including sustainable harvest of living marine resources. The determination of appropriate sustainable waterfowl hunting regulations is already ongoing through a separate and well-established process. A Morro Bay SMCA could and should simply allow waterfowl hunting as set through that process.

J-4

The specific questions that we would like to see addressed in the final EIR/CEQA include:

1. Given the significance and rarity of estuarine systems within the Central Coast Region, and Morro Bay in particular, how is an SMRMA designation for Morro Bay consistent with the Goals of the Central Coast MPA Project which include creating a network of Marine Protected Areas and sustaining marine resources, when a Recreational Management Area is by definition not an MPA, and its primary intent is not to protect or sustain natural resources?
2. A Marine Recreational Management Area designation suggests that this area will be managed to maximize one or more recreational activities. What activity or activities does the Department intend the Morro Bay SMRMA to be primarily managed for, and how is this consistent with the goals of the Project?
3. The draft documents imply that the SMRMA designation for Morro Bay is related to waterfowl hunting. Please be more explicit about this rationale.
  - a. Are waterfowl a 'marine resource' under the MLPA?
  - b. Would changing the designation to a SMCA, with all the same uses and restrictions as currently proposed for the Morro Bay SMRMA, impact waterfowl hunting at all?

J-5

J-6

J-7

- c. Why is an SMRMA designation for this area of Morro Bay superior in any way to a SMCA designation?

The Estuary Program looks forward to seeing these questions addressed in the final EIR and CEQA documents.

In closing, we respectfully suggest that changing the proposed Morro Bay SMRMA to the Morro Bay SMCA will:

- Resolve the significant problem that a SMRMA is not an MPA designation;
- Ensure that the Morro Bay designation is consistent with the MLPA goals to protect and conserve marine resources;
- Provide broad leeway to manage sustainable commercial and recreational uses including waterfowl hunting; and
- Recognize the significance of this rare estuarine environment and help protect and conserve the incredible diversity and abundance of marine resources that depend on it.

Thank you for your consideration of these comments and response to our questions.

Sincerely,



Daniel Berman  
Program Director  
Morro Bay National Estuary Program

Cc: Resources Secretary Mike Chrisman  
Director Ryan Broddrick  
BRTF Chairman Phil Isenberg  
DFG Policy Advisor John Ugoretz  
Morro Bay National Estuary Program Executive Committee  
Bay Foundation of Morro Bay

## Response to Letter J, from Morro Bay National Estuary Program

**Response to Comment J-1:** The Department disagrees. The Marine Managed Area Improvement Act (MMAIA) definition of a marine managed area found in Public Resources code states specifically "Marine managed area" (MMA) is a named, discrete geographic marine or estuarine area along the California coast designated by law or administrative action, and *intended to protect, conserve, or otherwise manage a variety of resources and their uses.*" [Emphasis added, PRC, 36602(d); see also FGC Section 2852(c)]. The definition of a state marine recreational management area is "a non-terrestrial marine or estuarine area designated so the managing agency may provide, limit, or restrict recreational opportunities to meet other than exclusively local needs while preserving basic resource values for present and future generations." [PRC 36700(e)]. Both of these definitions clearly show a primary intent of preserving marine life and habitats, even though subsequent uses may vary. Further, the MMAIA is expressly incorporated by reference into the Fish and Game Code, and contemplates coordination with the MLPA (FGC Sections 1591, 2854).

*No changes to the DEIR are required.*

**Response to Comment J-2:** The Department disagrees. The intent of the proposed SMRMA is to provide additional protection for subtidal resources while allowing for the continued take of waterfowl under existing regulations.

*No changes to the DEIR are required.*

**Response to Comment J-3:** Comment noted.

*No changes to the DEIR are required.*

**Response to Comment J-4:** The Department disagrees. The commenter admits that it is unclear whether waterfowl are living 'marine resources'. If not, their take would not be permissible in an MPA. Also, the specific issue of hunting waterfowl within this area has been raised as a potential unintended restriction if an MPA classification is used. Thus, the use of a SMRMA is more appropriate as it can specifically be established by the Commission to allow hunting.

*No changes to the DEIR are required.*

**Response to Comment J-5:** See Response to Comment J-1 above. The proposed regulations provide for a significant increase in protection within this important ecosystem. Thus, the Morro Bay SMRMA helps achieve the MLPA Goals and central coast objectives.

*No changes to the DEIR are required.*

**Response to Comment J-6:** See Response to Comment J-1 above. The primary intent of the area is to protect and conserve resources. This intent can be fulfilled while still allowing the specific recreational activities of fishing for finfish in a limited area and the hunting of waterfowl.

*No changes to the DEIR are required.*

**Response to Comment J-7:** There is no definitive statutory guidance as to whether all waterfowl are "marine resources" pursuant to the MLPA and the MLPA does not provide a definition of "marine resources" or "living marine resources". The Marine Life Management Act defines "marine living resources" as "...all wild mammals, birds, reptiles, fish, and plants that normally occur in or associated with salt water..." (FGC Section 96). Thus, waterfowl that are normally associated with Morro Bay could be considered marine resources. Changing the designation of the area to an SMCA in the northern portion may not have an impact on waterfowl hunting. In the southern portion, however, an SMCA designation would be inappropriate as the area is essentially no-take and would have to be a state marine reserve. Since no take of living marine resources is permitted within state marine reserves, hunting of waterfowl could be prohibited. In order to simplify the regulations, having a single area which can very specifically allow waterfowl hunting is more appropriate.

*No changes to the DEIR are required.*

**From:** Melissa Miller-Henson [melissa@resources.ca.gov]  
**Sent:** Thursday, December 28, 2006 6:32 AM  
**To:** mlpa\_strgcmte@resources.ca.gov; mlpacomments@dfg.ca.gov  
**Subject:** Fwd: MLPAComments: Central Coast MPA CEQA document

-----Original Message-----

From: owner-mlpacomments@resources.ca.gov on behalf of Willow Heatherbrook  
 [whippoorwhil\_whistle@hotmail.com]  
 Sent: Wed 12/27/2006 3:07 PM  
 To: mlpacomments@resources.ca.gov  
 Cc: fgc@fgc.ca.gov  
 Subject: MLPAComments: Central Coast MPA CEQA document

I have the following comments on the EIR:

Page 6-24: It states-

If one assumes the same amount of fishing pressure in the project region before and after an MPA is established, then the amount of fishing outside the MPA will increase in proportion to the size of the MPA for the species restrictions applied to the MPA. That is, the fishing that used to occur inside what is now an MPA will be distributed outside the MPA in the remaining, non-protected area in proportion to the size of the MPA. This can be simply calculated. If R is the fraction of area in MPAs within the study region, then fishing intensity outside the MPAs will increase by a factor  $1/(1-R)$ . For example, if 15% of the habitat is closed to fishing in MPAs, the intensity of fishing outside would increase by  $1/(1-0.15) = 1.18$ . That is, if the same number of users were fishing the same number of hours in the remaining 85% of the habitat, the fishing intensity would be 18% higher than before. In this example, in the short term, displacement would increase mortality rates outside the MPAs probably by 18%. However, if MPAs enhance populations beyond their boundary through movement of adults or young, these increases could be offset or eliminated by MPA benefits. The increased production within the MPA boundaries necessary to counter the increased fishing intensity outside can be calculated as well. The formula is  $1+[1/(1-R)]$ . For the example above, the result equals 2.18. This means that production inside the boundary of the MPAs must increase by a factor of 2.18 to just balance the added losses outside the MPAs. A higher level of production would be needed to help rebuild depleted populations, one of the goals of the MLPA. The relative time for the Proposed Project or alternatives to achieve the goals of the MLPA must also be considered in the impact analysis.

Comment:

This section grossly underestimates the impacts of displaced fishing effort by use of this very flawed assumption. This assumption used to address potential impacts is that all habitats along the central coast is equal in its productivity and fishing popularity. The arbitrary and erroneous assumption underestimates the significant impacts that will occur when fishing effort is displaced from the prime habitats protected in the MPAs is pushed into habitats of much lower productivity. This fishing effort will destroy the fish populations in the open areas. The current analysis is flawed and the CEQA document must use a more realistic analysis of the proposed project. Otherwise significant environmental harm could result from the project outside the proposed MPAs

Page 6-26: It states-



Data from existing reserves show that in spite of the increased fishing effort around reserves, the abundance of targeted species is highest in reserves and declines in proportion to distance from reserves. If the concentrated fishing effort around reserves caused local declines, the abundance of targeted species would be high within and distant from reserves but low at the edges of reserves. However, numerous reserves have been studied worldwide and this pattern of decline has not been detected (e.g., Roberts and Hawkins 2000). Therefore, the positive effects of reserves on abundance appear to counteract potential negative effects of displacement or concentration of fishing activity around reserves.

Comment:

This section is conclusory without specific facts to support the assertions.

There is no mention or discussion of how relevant the findings in these parts of the world are to the specific proposed project. The reader can't determine with any reasonable ability based on information provided that the same benefits, and more importantly, what harm may be caused to the surrounding areas with the adoption of the proposed project.

K-2

Page 6-27: It states -

If concentrated fishing at the edges of MPAs reduces habitat quality, a corresponding decrease in abundance and diversity of species adjacent to MPAs would be expected. As indicated above, this trend is not observed at the edges of reserves from previous studies worldwide, which consistently support higher abundance and diversity of fishes and invertebrates than other sites distant from reserves. No published data on existing MPAs have shown negative environmental impacts. Therefore, displacement-related impacts of the Proposed Project resulting in adverse impacts to marine species populations and habitats would be less than significant.

K-3

Comment:

This section is conclusory without specific facts to support the assertions.

Just because there are no published data showing negative environmental impacts of reserves does not by itself prove or make reasonable the conclusion that there will be no displacement-related negative impacts.

Page 6-30: It states -

As illustrated in Table 6.1-3, the Proposed Project and alternatives provide a substantial resource protection in addition to that provided by the groundfish closures. Alternative 2 has the highest total numbers of MPAs with no overlapping regulatory protections, while the Proposed Project and Alternative 1 both have slightly fewer MPAs with no overlap. Conversely, all of the alternatives show some degree of overlap with the groundfish closures, which serves to reduce some the potential negative impact to fishermen from the implementation of the MPAs. Alternative 2 has the lowest number of MPAs with a combined full or partial overlap. The Proposed Project and Alternative 1 are fairly similar in their combined full and partial overlap, but the Proposed Project would result in substantially more fully overlapping MPAs.

K-4

Comment:

It is not clear how the fact that all of the alternatives showing some degree of overlap with the groundfish closures will help reduce some of the potential negative impacts to fishermen with implementation of MPAs. The CEQA document must explain why this would reduce the potential negative impacts.

Page 6-31: It states:

Proposed Project: Beneficial Impact

There will be substantial biological resource benefits because of the increased habitat protection that would occur under the proposed MPA network component. There also is likely enough area protected within proposed MPAs to provide some benefits to some overfished rockfish populations that depend on these habitat types for some part of their life history, and to prevent further degradation of marine habitats that are vital to marine ecosystems of the central California study region.

Comment:

This conclusion is not supported by the facts provided. No where is it made clear what the risk to the habitat is relative to the nature of the proposed MPAs and the proposed regulations. The document does not explain how promulgating regulations that prevent hook and line halibut fishing protects any habitat. Other than banning a few fishing methods such as bottom trawling, which is already illegal in coastal waters, it is not at all clear how any of the regulations will in any way protect habitat.

In fact, it is not clear how the proposed project in any meaningful way can achieve Goal 4 as described on page 2-2. The CEQA document must explain in more detail how the proposed project is going to protect the identified habitats and from what threats.

K-5

Page 8-2: It states -

The Proposed Project would not have any direct growth-inducing impacts because no development is proposed. It would not indirectly induce growth because it proposes no extension of infrastructure or other environmental modifications that could foster population or economic growth. The protection of species and habitats proposed by the Proposed Project does not enable or encourage development elsewhere.

Comment:

This is an unsubstantiated conclusion. It is not clear how this conclusion is warranted without any analysis. It would seem reasonable from much of the literature cited from other MPAs throughout the world that they tend to attract more visitors than the area did before the establishment of the MPA.

If this phenomenon holds true for the proposed project, there could be significant increases in visitors which could result in all kinds of growth inducing impacts. The CEQA document must look at the transportation, development, and air quality impacts that might result from the establishment of the proposed MPAs. The analysis under section 8.4.5.2. Air Quality completely ignores the potential increase in motor vehicle traffic from people wanting to visit these MPAs. The CEQA analysis must evaluate these impacts.

K-6

Willow Forest  
Arcata, CA

Get FREE Web site and company branded e-mail from Microsoft Office Live  
<http://clk.atdmt.com/MRT/go/mcrssaub0050001411mrt/direct/01/>

## Response to Letter K, from Willow Forest

**Response to Comment K-1:** While the commenter is correct that displaced fishing effort is unlikely to be uniformly distributed, the specific locations of displacement are speculative. In contrast, the assumption used in the DEIR of uniform distribution is a defensible methodology that is not arbitrary. It presents the average displacement effect, and in fact makes the conservative assumption that fishing effort does not reduce as a result of the project. As a result, the methodology used in the DEIR likely overstates the extent of displacement. In addition, the commenter assumes that areas outside MPAs are "habitats of much lower productivity" yet provides no evidence to support the claim. To the contrary, the Proposed Project includes a small percentage of most habitat types, and it is unlikely that all habitats within MPAs are presently highly productive. Finally, existing data does not show that displaced fishing effort leads to reductions in fish populations in non-designated areas. Refer to the discussion in Impact BIO-1 in the DEIR (beginning on Page 6-25). Potential impacts are considered less than significant.

*No changes to the DEIR are required.*

**Response to Comment K-2:** The DEIR uses the best readily available data in evaluating the effects of displacement. No empirical evidence has been found to suggest that displacement results in adverse impacts to marine species populations and habitats, nor does the commenter provide any such evidence. See Master Response 2.0.

*No changes to the DEIR are required.*

**Response to Comment K-3:** The impacts discussed by the commenter are speculative and not supported by published data. CEQA requires that impact analysis not be based on speculation, but rather on empirical evidence suggesting that an impact is reasonably foreseeable. Because no such empirical evidence exists, the conclusion of a less-than-significant impact is appropriate.

*No changes to the DEIR are required.*

**Response to Comment K-4:** Potential impacts to fishing would be greatest in a scenario where all of the MPA area was in locations where fishing is presently allowed or unrestricted. By overlapping existing closure areas, the impacts of the project are less than they would be under such a scenario.

*No changes to the DEIR are required.*

**Response to Comment K-5:** As noted on page 2-2 of the DEIR, the objectives used to achieve the goal are to "represent" habitats within MPAs and to protect species associated with those habitats. The Proposed Project achieves both of these objectives, thus making progress to achieving the broader goal. While hook and line fishing may

not directly impact habitat, it does remove individuals of certain species from the ecosystem, thus upsetting the overall balance and potentially leading to habitat changes (Halpern, Cottenie and Broitman, 2006).

*No changes to the DEIR are required.*

**Response to Comment K-6:** The assertion that the designation of MPAs would attract more visitors to the area is unsubstantiated. While the tourism and recreation industry along the coast is anticipated to grow independent of MPA establishment, attributing potential growth to the Proposed Project is speculative. Please refer to the discussion in Impact PH-1 in the DEIR (beginning on page 7-18). As such, an evaluation of the effects on transportation, development and air quality of increased visitation is not warranted.

*No changes to the DEIR are required.*

**From:** Willow Heatherbrook [whippoorwhil\_whistle@hotmail.com]  
**Sent:** Thursday, December 28, 2006 8:46 AM  
**To:** mlpacommments@dfg.ca.gov  
**Subject:** Comments on Central Coast MPA CEQA document

I noticed that the ISOR for the regulations includes changes to MPAs outside the proposed project as described in the CEQA document. I have grave concerns about harm to the ocean in these areas to the north and south of the central coast MPAs. The CEQA document is inadequate and needs to be redrafted to include an appropriate analysis for the proposed MPA changes outside the Central Coast Study Region. I believe it only fair that the public have an understanding of the threats and what rules we could consider to protect our ecosystems.

L-1

Willow Forest  
Arcata, CA

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From photos to predictions, The MSN Entertainment Guide to Golden Globes has it all.  
<http://tv.msn.com/tv/globes2007/>

**Response to Letter L, from Willow Forest**

**Response to Comment L-1:** Changes proposed in the ISOR to areas outside the central coast are of a clarifying and editorial nature. They do not change the level of protection or restrictions in MPAs outside the central coast. Please refer to the discussion of cumulative impacts beginning on page 8-2 of the DEIR, which includes consideration of MPA designations outside the Central Coast Study Region.

*No changes to the DEIR are required.*

David W. Valentine, Ph.D.  
7305 Monte Vista Avenue  
La Jolla, CA 92037  
(858) 442-6036 (cell)  
[Dave\\_valentine\\_92037@yahoo.com](mailto:Dave_valentine_92037@yahoo.com)

## Letter M

28 December 2006

Mr. John Ugoretz  
Nearshore Ecosystem Coordinator  
Department of Fish and game  
20 Lower Regsdale Drive, Suite 100  
Monterey, CA 93940

Subject: MLPA DRAFT EIR Comments

Gentlemen;

Few would argue about the laudable goals of the MLPA as expressed in Section 2853(b). However, it is the manner in which to best achieve conservation and yet maintain a reasonable level of extractive use which is contentious. MLPA supporters seem certain that zero extractive use is the appropriate means of achieving these goals. Concerned citizens impacted by forced closures do not share the same arrogance as those who elect to preserve for the sake of preservation or who wish to have access to state and federal funds to “study” the problems *ad nauseum*.

Much has been made of the successes reported in MPA's in Florida and Australia but almost nothing of those in California. It should be recognized that MPAs in these two regions are not similar to those in California. The basic ecological structure of coral reef communities has little in common with kelp bed communities. Comparing these as if they are is fallacious. Kelp communities are far more resilient than coral communities.

M-1

The Channel Islands National Marine Sanctuary (CINMS) has been in existence over two decades. Yet the CINMS is not being used as the scientific centerpiece for additional MPAs. This is a damaging comment on either the effectiveness of sanctuary programs in general, this sanctuary in particular, or the manner in which previous monitoring programs have been established and the data analyzed. With 20 years worth of good data from 16 different sampling locations at 5 Channel Islands one should be able to make **definitive** statements as to what one might predict the effects of more MPAs to be. This was not done in the

M-2

Draft EIR. Only the most general statements were made none of which were compelling or supported by “**scientific**” findings. I personally find this very disappointing.

M-2  
Continued

To reach the above conclusions I reviewed more than just the draft EIP. I reviewed the *Master Plan Framework* and the “*Draft Monitoring Evaluation and Adaptive Management Framework* (Framework) and supporting documents

All the documents I have reviewed demonstrate a high level of editorial care but lack **scientific** content. There are hints of science but these were likely included after heated encounters between scientists and politicians who believe that the only way to “save” our seas is to close them to recreational and commercial uses. This apparent dichotomy is perhaps best illustrated in the “*Channel Islands Marine Protected Areas Monitoring Plan*” document. There is a glimmer of insight when one reads the section titled “*Sources of Uncertainty*” but this is soon shattered after reading the section on “*Effectiveness and Timeliness of MPAs*”.

The fact that extremely good editing camouflages sections of scientific insanity leading to visions of grandeur are questioned. For instance, the “*Monitoring Plan*” is not a plan *per se*, but a discourse on MPA principles taken from other MPAs around the world which have marginal applicability to California. Conclusions are based on unverified, un-validated, non-sensitized computer models which may be of questionable utility. The plans espoused will not gather date on “natural abundance”, or “natural diversity”.

M-3

The subject of “Benchmarks” is broached in the Framework, as is a gratuitous reference to “statistical significance”. The concept sounds wonderful to a layperson but not to anyone with a smattering of statistics. A change of 20 percent can be noise level while 1% can be statistically significant

Let us start at ground “zero”. Why do MLPA staffers believe a given area is over stressed? Based on CF&G fishery statistics? Is the objective of the MLPA movement to restore depleted fisheries or restore stressed ecosystems? Has not the CF&G fulfilled fisheries objectives by setting bag, season, and size limits on a species by species basis? Has not the CF&G demonstrated their ability to effectively manage a fishery from over exploitation using standard fisheries techniques? Coincidentally, this is also a criticism leveled by the Science and Statistical Committee (SSC) of the Pacific Fishery Management Council, who noted that the MPA authors “*appear to ignore the trade-off between reserves and traditional fisheries management*” (Final Environmental Document)

I like exercising more positive control over our marine resources but find it very discouraging that closure is strongly favored over regulation. Good scientists often err and tend to believe that “correlation is causation”. It is not. Spuriously



correlating a decline in fisheries productivity with general ecosystem decline is not good science. This, though, seems to be what the MPLA infers.

M-3  
Continued

As far as I can determine no one has been able to document a biologically significant impact of any of the Channel Islands MPA sites on “biodiversity” or an increase or decrease in “important” ecological components using any rational ecological measure. And this after twenty years of study. Given this it seems prudent to put more effort into determining what documented “facts” can be supported with all of the data which have been gathered so far.

M-4

Let us manage our marine resources so that the greatest number of people can garner the maximum benefit and yet assure that these resources will be available to our descendants.

Yours truly,

<<<sent via email, no signature>>>

David W. Valentine, Ph.D.  
Retired Marine Scientist

File: MLPA EIR COMMENTS

### **Documents Reviewed**

AB 993 as filed on 10 October 1999

October 2002

Final 2002 Environmental Document, Marine Protected Areas in the National Oceanographic and Atmospheric Administration’s Channel Island National Marine Sanctuary, Volume I.

February 2004

Channel Islands Marine Protected Areas, Monitoring Plan

10-11 August 2005

MLPA Central Coast Regional Stakeholder Group Draft Final Profile

August 15, 2005

Appendices to the Draft Master Plan Framework

August 22, 2005

Draft Master Plan Framework (“redline” edition)

January 24, 2006 Draft

Initial Draft management Plan Framework

January 24, 2006

Draft Monitoring, Evaluation and Adaptive Management Framework

Undated

Channel Islands Monitoring Workshop, Participant Worksheet Results

**Response to Letter M, from David Valentine**

**Response to Comment M-1:** It is true that coral reef communities are different than kelp beds. Scientific studies have shown, however, that the effects of MPAs are actually more dramatic within temperate rocky reefs than in coral reef ecosystems. Thus, while direct comparison may not be correct, potential for rehabilitation in temperate reefs may actually be greater (Gaines, et. al., 2003; Murray, et. al., 1999)

*No changes to the DEIR are required.*

**Response to Comment M-2:** The Channel Islands National Marine Sanctuary is not an MPA by the State of California definition. Only one small no-take area that was previously designated is available to use for comparison, the Anacapa Island Natural Area. Recently, 12 new MPAs were established within the Sanctuary, but they have only been in existence since 2003. Data from the Natural Area were used in the designation process and studies from this MPA area cited (e.g., Ambrose, et. al., 1993; Carrol, et. al., 2000)

*No changes to the DEIR are required.*

**Response to Comment M-3:** The Department disagrees. See various scientific references throughout.

*No changes to the DEIR are required.*

**Response to Comment M-4:** The Department disagrees. See response M-2, only the previously designated Anacapa Natural Area has been studied in excess of 20 years. This area has shown increases in abundance of species which play key roles in kelp forest ecosystems, such as spiny lobsters.

*No changes to the DEIR are required.*

## Letter N



December 28, 2006

MLPA Central Coast CEQA  
California Department of Fish & Game  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

To the California Department of Fish and Game:

On behalf of the Ocean Conservancy, the Natural Resources Defense Council (NRDC), and The Otter Project, and our more than 160,000 combined California members, we offer these comments on the Draft Environmental Impact Report (DEIR) for the California Marine Life Protection Act Initiative Central Coast Marine Protected Areas Project. Our organizations have been involved with implementation of the Marine Life Protection Act (MLPA) for many years, and we support the Proposed Project because it will provide substantial benefits to the state of California by protecting marine life and underwater habitats. We believe that the DEIR provides a legally sufficient and fundamentally sound foundation for the state's decision and fulfills the purposes of the California Environmental Quality Act (CEQA) to "prevent the elimination of fish or wildlife species due to man's activities [and] insure that fish and wildlife populations do not drop below self-perpetuating levels,"<sup>1</sup> as well as to "inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities."<sup>2</sup> We have organized our specific comments by chapter.

N-1

### Executive Summary

Overall, the Executive Summary provides a useful overview of the contents of the DEIR and the proposed project and alternatives. We recommend additional text be added under "Comparison of Proposed Project and Alternatives"<sup>3</sup> to include the conclusions from Chapter 9. Specifically, the Executive Summary should note that Alternative 2 is identified as the "environmentally

N-2

<sup>1</sup> Public Resources Code §21001(c).

<sup>2</sup> CEQA Guidelines §15002(a)1.

<sup>3</sup> DEIR, page ES-10.

superior alternative” under CEQA, that Alternative 1 “falls short of meeting the MLPA intent for a cohesive biological network,” and that the Proposed Project has been determined to be “the most likely to achieve the full range of MLPA goals and objectives.”<sup>4</sup> These fundamental conclusions are likely to be of significant interest to both decision makers and the public and warrant being highlighted in the Executive Summary.

N-2  
Continued

The Executive Summary contains a list of “Areas of Known Controversy/Issues” on p.ES-12, consistent with CEQA guidelines<sup>5</sup>. The DEIR should also note that the existence or perception of public controversy in and of itself does not require the preparation of an EIR.<sup>6</sup> CEQA requires that an EIR identify and focus on the evidence for potential significant environmental effects of a proposed project, and examine possible changes in the existing physical conditions in the affected area.<sup>7</sup> It is our view that there is no evidence that the proposed project will have significant adverse effects, individually or cumulatively, on the environment or on human beings as defined under CEQA. In fact, we believe that the Proposed Project and network of marine protected areas will have long-term beneficial impacts on the marine and human environment by helping restore degraded habitats and protecting spawning populations and biodiversity.

N-3

#### Chapter 4, Consumptive Uses and Socioeconomic Considerations

The DEIR accurately states in Section 4.1 that “CEQA does not require the consideration of direct economic or social factors in its impact analyses,” and CEQA provides that “economic or social effects shall not be treated as significant effects on the environment.”<sup>8</sup> We appreciate that the Department of Fish and Game (DFG) has provided substantive background information in the DEIR itself to help provide context and inform the decision-making process. However, Chapter 4 includes extensive discussions of social and economic considerations that go well beyond the information required under CEQA to describe indirect physical effects caused by changes in human use patterns.<sup>9</sup> Therefore, we suggest that DFG integrate much of this discussion in Chapter 4 into Chapter 2 as background information or include it as a separate appendix.

N-4

Chapter 4 also identifies the physical displacement of fishing effort as one potential impact to the environment.<sup>10</sup> There is no substantial evidence that displacement from any of the alternatives considered in the DEIR will have significant environmental effects, and therefore mitigation

N-5

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<sup>4</sup> DEIR, Section 9.4.

<sup>5</sup> CEQA Guidelines §15123(2)b.

<sup>6</sup> PRC §21082.2(b).

<sup>7</sup> CEQA Guidelines §15126.2.

<sup>8</sup> Id at §15131(a).

<sup>9</sup> Id. at §15131.

<sup>10</sup> See DEIR pages 4-25 through 4-28.

measures are not required under CEQA. <sup>11</sup> To improve clarity in the DEIR, we suggest that all discussion and analysis of potential biological effects (including those related to fishery displacement and congestion) be confined to Chapter 6 (Biological Resources). We offer the following suggestions for the DEIR's discussion of socioeconomics:	N-5 Continued
<ul style="list-style-type: none"> <li>The discussion of larger economic conditions should include economic information from the 2005 report "California's Ocean Economy"<sup>12</sup> and the most recent Fisheries of the U.S.<sup>13</sup> report (2004) rather than the 2000 NOAA report cited.</li> </ul>	N-6
<ul style="list-style-type: none"> <li>Several sections of Chapter 4 appropriately refer to the speculative nature of predicting how fishermen may change their fishing behavior in response to the new MPAs. Treating fishermen as a homogeneous group overlooks the significant variation in individual behaviors, such as the tendency for some fishermen to be more pioneering than others in developing new fishing approaches.<sup>14</sup> Treating the fishermen and vessels in the Proposed Project area as a uniform group may be an overly simplistic assumption, and the DEIR should discuss the uncertainty inherent in its estimates.</li> </ul>	N-7
<ul style="list-style-type: none"> <li>Page 4-3, paragraph 1 states that profiles of important commercial fisheries can be found in Appendix D; Appendix D contains only maps.</li> </ul>	N-8
<ul style="list-style-type: none"> <li>Section 4.2.1.2 omits mention of recent federal<sup>15</sup> and private<sup>16</sup> vessel buyout programs, which have reduced the size of California fleet and the number of vessels active in the project area.</li> </ul>	N-9
<ul style="list-style-type: none"> <li>Sections 4.3.1 and 4.3.2 appear to be mislabeled and missing citations. The term "displacement effort" is not defined in Sanchirico et al 2002, which discusses the displacement of effort. The segregation of "macroeconomic" and "microeconomic" considerations does not appear to be particularly useful or accurate—macroeconomics concerns would be the movements of national economies, not the possible impacts of El Nino events on a single region of the California coast.</li> </ul>	N-10
<ul style="list-style-type: none"> <li>The opinions listed in 4.3.2.1 and 4.3.2.2 should be clearly presented as such, as they are not supported by data demonstrating actual impacts.</li> </ul>	N-11
<ul style="list-style-type: none"> <li>Section 4.3.3. refers to the "potential impact to fishing vessels." This should be clarified to indicate that the primary concern under CEQA is the potential physical impacts to the environment resulting from changes in fishing activities, not direct effects on vessels. Again, discussion of potential biological impacts, if any, should moved to Chapter 6.</li> </ul>	N-12
<ul style="list-style-type: none"> <li>Table 4-2 should include the information from Scholz et al (2006a) characterizing potential impacts on statewide important fishing grounds, not solely those in the study region, since fishermen may move to state waters outside the Central Coast or to federal</li> </ul>	N-13

<sup>11</sup> CEQA Guidelines §15126.4(a)3.

<sup>12</sup> Kildow, J. and C.S. Colgan. (2005) "California's Ocean Economy: a report to the Resources Agency, State of California." National Ocean Economics Program. <http://noep.csumb.edu/Download/>

<sup>13</sup> <http://www.st.nmfs.gov/st1/publications.html>

<sup>14</sup> See, for example, Branch, T. A., R. Hilborn, et al. (2006). "Fleet dynamics and fishermen behavior: lessons for fisheries managers." Canadian Journal of Fisheries and Aquatic Science 63: 1647-1668.

<sup>15</sup> <http://www.pcouncil.org/groundfish/gfbuy.html>

<sup>16</sup> <http://www.nature.org/wherewework/northamerica/states/california/features/art18316.html>

waters. For example, according to the available data, the Proposed Project could impact nearly 24% of the important sablefish grounds within the study area. However, most sablefish grounds lie outside state limits, and therefore the Proposed Project is estimated to impact less than 4% of the total important sablefish grounds. This broader context is essential information for decision makers and the public.

N-13  
Continued

Finally, Chapter 4 presents estimates of maximum potential loss which are essentially worst-case economic scenarios, where area lost translates into income lost and fishermen stop fishing or even abandon their vessels. This is in marked contrast to the analysis in Chapter 5, which assumes all vessels will continue fishing, concentrated in coastal air basins and potentially negatively impacting air quality. While both Chapters acknowledge the uncertainty of their estimates, the text does not reflect the interdependence of their predictions; essentially that both cannot be true simultaneously.

N-14

#### Chapter 5, Air Quality

The DEIR notes that all three alternatives could result in significant and unavoidable air quality impacts under CEQA, based on the San Luis Obispo Air Pollution Control District's conservative significance thresholds for NO<sub>x</sub> emissions. As we mention in our discussion of Chapter 4, the text in these two chapters should better articulate the difficulties in predicting fishing vessel behavior and any subsequent physical impacts. It is equally likely that vessels will travel shorter distances and therefore result in less impact to air quality or that boats will fish in areas further from vulnerable populations that could suffer from acute effects. Considering that many of the fisheries with the largest estimates of displacement already have regulations in place to limit fishing effort it seems unlikely that the Proposed Project will increase impacts on air quality beyond current levels.

N-15

Also, Table 5.1-3 is mislabeled, and p. 5-12 should cite Chart 4-1 as a source of data on the declining numbers of registered vessels.

N-16

#### Chapter 6, Biological Resources

This Chapter includes a description of the regulatory framework surrounding the Proposed Project, starting at Section 6.1.2. We recommend that the California Nearshore Fishery Management Plan (NFMP) get its own subsection, rather than being subsumed under the Marine Life Management Act or the general description of groundfish resources, due to the importance of the NFMP and its relationship to the MLPA. Nearshore fisheries receive specific attention in Chapters 4 & 5 and nearshore fishing vessels are the primary boats analyzed to determine

N-17

potential air quality impacts.<sup>17</sup> The DEIR should include sections from the NFMP that explicitly discuss the use of MPAs in the nearshore, such as:

N-17  
Continued

Marine Reserves (and to a lesser degree Marine Conservation Areas and Marine Parks) are especially capable of meeting the MLMA's goals regarding conservation of ecological communities and allowing non-extractive uses of marine living resources. To meet these goals, according to the NRC report, a minimum of 10% of appropriate habitat should be included in marine reserves, if management outside the reserves is excellent. If management outside the reserves is less effective, 20% or more area may be required. A network of MPAs should place reserves and conservation areas close enough together to benefit from larval transport between MPAs. In addition, the size of individual MPAs must be large enough to protect adequate spawning biomass and to retain larval recruitment from outside of the MPA.<sup>18</sup>

The management tools authorized under the NFMP—including regional management, catch limits, restricted access, and gear limitations—are also the tools available to the Commission to mitigate any potential adverse impacts from displacement. The DEIR briefly mentions these tools at the top of p.6-31, but we believe a fuller discussion of the NFMP could improve the analysis in Chapters 4 & 6 as well as better inform decision makers and the public.<sup>19</sup> We also suggest updating the information on the Magnuson-Stevens Act to reflect that the Act was recently reauthorized by Congress, and referencing the halibut trawl permit program<sup>19</sup> under Section 6.1.2.2.

N-18

N-19

Inclusion in the DEIR of more detailed information on the percentage of each habitat type included in the alternatives in the DEIR would further clarify that the majority of fished habitats in the Central Coast would remain unaffected by the Proposed Project. The analysis of important fishing grounds potentially affected by MPAs demonstrates that for 14 of 19 commercial fisheries assessed, more than 90% of total fishing grounds would be unaffected by the Proposed Project. For the remaining five fisheries (cabezon, deep nearshore rockfish, kelp greenling, lingcod, and nearshore rockfish) between 78-81% of total grounds are unaffected. Fully 98% of recreational salmon trips and 78% of recreational rockfish trips would be unaffected by the proposed MPAs.

N-20

We agree with the DEIR's conclusion that the Proposed Project will not result in significant displacement-related impacts to marine species populations and habitats. This conclusion is supported both by the overall habitat coverage analysis on p. 6-29 (Chart 6.1-2) and by the analysis of important fishing grounds potentially affected by MPAs found at p. 4-25 and p. 4-26, which should be cross-referenced here. As noted in the DEIR, studies from around the world

N-21

<sup>17</sup> Table 5.1-3 breaks the rockfish fishery into three: nearshore, slope and shelf. Of these, only the nearshore fishery is identified as having vessels that could be displaced and thus the nearshore fishery is primarily determining the impacts listed in Table 5.1-5.

<sup>18</sup> NFMP, p. 3-131. See also p. 3-108. <http://www.dfg.ca.gov/mrd/nfmp/index.html>

<sup>19</sup> Cal. Fish & Game Code §8494

have not demonstrated such impacts and support the opposite conclusion—MPAs result in environmental benefits that can extend beyond the boundaries of the protected areas.<sup>20,21,22</sup>

Accordingly, there is no evidence that the Proposed Project would result in significant biological impacts resulting from displaced fishing effort and extensive evidence in the record to the contrary.

N-21  
Continued

Finally, we recommend adding sources to document the state of west coast fish populations, such as Levin et al (2006)<sup>23</sup>, which found the average size of fish declined by 45% from 1977-2001 and Mason et al (1998)<sup>24</sup> which found similar declines for recreationally caught fish.

N-22

#### Chapter 7, Social Resources

We appreciate the full discussion in Chapter 7 of the significance of tourism to the study region, including kayaking, SCUBA diving, whale-watching and other non-consumptive recreation. This type of recreation is likely to increase following adoption of the Proposed Project, as noted on p.7-41.

N-23

Chapter 7 should clarify if criteria 2 and 3 are being evaluated together under "Impact REC-2" in Section 7.4.3.3. Also, the document cites a variety of numbers for sportfishing participation including 2.7 million anglers (p. 4-15) and 1.5 million anglers (p. 4-17). Table 7.4-1 is from a report by Leeworthy and Wiley (2001)<sup>25</sup> which estimates there were 2.7 million California sportfishing participants in 1999, including both residents and non-residents. If the DEIR is going to use this survey data for non-consumptive recreation, it may help improve the consistency of the document if the same source is used for sportfishing participation and text is added to Chapter 4 explaining the discrepancies between survey-based estimates and license sales.

N-24

N-25

We appreciate the opportunity to comment on the DEIR and participate in the Central Coast MLPA process. We commend the Department for producing the DEIR, which we believe to be adequate and legally sufficient under the law. Our organizations strongly support the Proposed Project and the efforts of the state of California to improve the management and protection of its marine life.

N-26

<sup>20</sup> Rodwell, L. M., E. B. Barbier, et al. (2003). "The importance of habitat quality for marine reserve-fishery linkages." Canadian Journal of Fisheries and Aquatic Science 60: 171-181.

<sup>21</sup> Wallace, S. S. (1998). "Evaluating the Effects of Three Forms of Marine Reserve on Northern Abalone Populations in British Columbia, Canada." Conservation Biology 13(4): 882-887.

<sup>22</sup> Johnson, D. R., N. A. Funicelli, et al. (1999). "Effectiveness of an Existing Estuarine No-Take Fish Sanctuary within the Kennedy Space Center, Florida." North American Journal of Fisheries Management 19: 436-453.

<sup>23</sup> Levin, P. S., E. E. Holmes, et al. (2006). "Shifts in a Pacific ocean fish assemblage: the potential influence of exploitation." Conservation Biology 20(4): 1181-1190.

<sup>24</sup> Mason, J. E. (1998). "Declining rockfish lengths in the Monterey Bay, California recreational fishery, 1959-94." Marine Fisheries Review 60(3): 15-28.

<sup>25</sup> Available at [http://marineeconomics.noaa.gov/NSRE/NSRE\\_2.pdf](http://marineeconomics.noaa.gov/NSRE/NSRE_2.pdf)

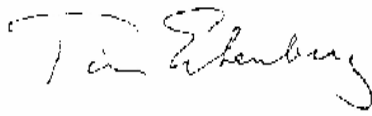


MLPA Central Coast CEQA  
December 28, 2006  
Page 7

Sincerely,

A handwritten signature in black ink, appearing to read "Kate Wing".

Kate Wing  
NRDC

A handwritten signature in black ink, appearing to read "Tim Eichenberg".

Tim Eichenberg  
The Ocean Conservancy

A handwritten signature in blue ink, appearing to read "Steve Shimek".

Steve Shimek  
The Otter Project

**Response to Letter N, from NRDC, the Otter Project, and the Ocean Conservancy**

**Response to Comment N-1:** Comment noted.

*No changes to the DEIR are required.*

**Response to Comment N-2:** Comment noted.

*Revisions to the DEIR:*

Text has been added to the Executive Summary as noted (refer to Chapter 3 of this Final EIR).

**Response to Comment N-3:** Comment noted.

*Revisions to the DEIR:*

Text has been added to the Executive Summary as noted (refer to Chapter 3 of this Final EIR).

**Response to Comment N-4:** Comment noted.

*No changes to the DEIR are required.*

**Response to Comment N-5:** A brief discussion of potential biological effects related to fishery displacement and congestion have been included in Chapter 4 to improve readability and assist readers in understanding the importance of the socioeconomic data. However, Chapter 6 provides a more detailed assessment of these biological effects. By providing this information in both places in the DEIR, readers are expected have an improved understanding of the impact analysis.

*No changes to the DEIR are required.*

**Response to Comment N-6:** The Department appreciates this reference to additional information regarding larger economic conditions. However, because it does not fundamentally alter the impact analysis in the DEIR, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment N-7:** Comment noted. The DEIR notes that the estimates are likely overestimates and are not exact.

*No changes to the DEIR are required.*

**Response to Comment N-8:** Comment noted.

*Revisions to the DEIR:*

Text has been corrected in Chapter 4 to note that commercially important fishery profiles can be found in the Regional Profile of the Central Coast Study Region (refer to Chapter 3 of this Final EIR).

**Response to Comment N-9:** Comment noted. The federal vessel buyout program, carried out in 2003 by the National Marine Fisheries Service, resulted in the elimination of 92 fishing vessels and 240 fishing permits in Washington, Oregon, and California. Of these, 92 permits were groundfish trawl permits, and 121 were crab and shrimp permits. In addition, during the summer of 2006, the Nature Conservancy purchased six federal trawling permits, and four trawling vessels. The Nature Conservancy is currently banking harvest rights for potential future use towards sustainable groundfish harvest.

Data was not available to indicate what proportion of these permits included vessel or permits that were fishing in the Central Coast Study Region; however, it is reasonable to assume that some portion was in the project study area and that Section 4.2.1.2 of the DEIR overestimates the number of licenses and vessels as a result of this information. It does not fundamentally change the conclusions of the DEIR, but does indicate that the DEIR may actually overstate displacement effects.

*No changes to the DEIR are required.*

**Response to Comment N-10:** The DEIR is not meant to infer that the term “displacement effort” was defined in Sanchirico et al. (2002); rather, it is defined in the DEIR as a footnote and the term as used in the DEIR is generally interchangeable with the concept of “displacement of effort” discussed in Sanchirico et al. (2002).

The Department disagrees that microeconomic and macroeconomic considerations are not useful or accurate; the terms are used to segregate different types and scales of forces acting upon the fishing industry and related economy. See Master Response 3.0.

*No changes to the DEIR are required.*

**Response to Comment N-11:** Comment noted. The information presented in this section is taken from Kronman et al. (2000). The commenter is correct that the effects of these forces are speculative in many cases, and as such, were not specifically used in the evaluation of impacts.

*No changes to the DEIR are required.*

**Response to Comment N-12:** The commenter is correct that the primary impacts of concern under CEQA are not direct effects on fishing vessels, but rather secondary effects such as biological impacts resulting from displacement. Please refer

to Response to Comment N-5 regarding the location for discussion of biological impacts in the Draft EIR.

*No changes to the DEIR are required.*

**Response to Comment N-13:** Comment noted. It is true that Table 4-2 in the DEIR overstates the effect of the project when considering fishing grounds located outside of the Central Coast study region. However, for the purposes of gauging the intensity of displacement, the DEIR has made the conservative assumption that all displacement effects would occur within the Central Coast study region. In reality, the intensity of displacement within the Central Coast Study Area would be less than is presented in the DEIR, although the extent to which this would occur is speculative. The Department does not anticipate that displacement to locations outside of the study area would result in significant adverse impacts, for the same reasons that displacement would not have adverse impacts within the study area.

*No changes to the DEIR are required.*

**Response to Comment N-14:** Comment noted. In many cases, the DEIR makes a “reasonable worst-case” assumption in evaluating impacts. The characteristics of a reasonable worst-case scenario are often different depending upon the impact being evaluated. For this reason, some impacts could not occur simultaneously, because they are based on a different set of assumptions. However, in an effort to present the reasonable worst-case and disclosing the maximum potential impact for each topic, the DEIR uses varying assumptions where appropriate.

*No changes to the DEIR are required.*

**Response to Comment N-15:** The Department agrees, and the text of the DEIR reflects the uncertainty regarding air quality impacts. However, in the face of uncertainty, the DEIR has made reasonable worst-case assumptions such that it fully discloses the maximum potential extent of the impact.

*No changes to the DEIR are required.*

**Response to Comment N-16:** Comment noted.

*Revisions to the DEIR:*

Table 5.1-3 and associated text have been revised accordingly (refer to Chapter 3 of this Final EIR).

**Response to Comment N-17:** The Department appreciates the additional information regarding the California Nearshore Fishery Management Plan. However, because it does not fundamentally alter the impact analysis in the DEIR, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment N-18:** Comment noted. The analysis as presented is adequate to satisfy the requirements of CEQA, and as such no change to the DEIR is warranted. Note that with the exception of air quality, the DEIR has concluded that there are no significant adverse impacts from displacement, and as such the tools described in the comment are not necessary to mitigate impacts.

*No changes to the DEIR are required.*

**Response to Comment N-19:** Comment noted. However, because this setting information does not fundamentally alter the impact analysis in the DEIR, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment N-20:** The information requested by the commenter is already presented in the DEIR. The project description (Chapter 2 of the DEIR) presents percentages of each habitat type included in the project and each alternative (see Tables 2-5, 2-9 and 2-13). Section 4.3.3 of the DEIR (beginning page 4-25) presents a presentation of the effects of the project and alternatives on specific important fishing grounds and recreational effects. Please refer specifically to Tables 4-2 and 4-3.

*No changes to the DEIR are required.*

**Response to Comment N-21:** Comment noted.

*No changes to the DEIR are required.*

**Response to Comment N-22:** The Department appreciates the additional sources regarding the state of West Coast fish populations. However, because this information does not fundamentally alter the impact analysis in the DEIR, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment N-23:** The commenter is incorrect. The DEIR does not conclude that non-consumptive recreation is likely to increase as a result of the project. Indeed, any such increase is speculative, and would be difficult to specifically attribute to the project.

*No changes to the DEIR are required.*

**Response to Comment N-24:** Impact REC-1 addresses the first two impact criteria, while Impact REC-2 addresses the third criterion.

*No changes to the DEIR are required.*

**Response to Comment N-25:** Comment noted. However, because the requested changes would not fundamentally alter the impact analysis in the DEIR, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment N-26:** Comment noted.

*No changes to the DEIR are required.*



# Letter O

December 29, 2006

MLPA Central Coast CEQA  
Department of Fish & Game  
Marine Region  
20 Lower Ragsdale Ave, Suite 100  
Monterey, California 93940

RE: Draft EIR, MLPAL Central Coast Project Area

Dear Sirs:

The California Fisheries Coalition herewith submits comments regarding the Draft Environmental Impact Report, MLPAL Central Coast Project Area. Our review reveals how the EIR falls short of its purpose to provide the public and the Fish and Game Commission a full understanding of the potential impacts from and the effectiveness of various project alternatives.

The EIR provides no new information, no rigorous analysis of potential impacts, and no assessment of benefits that may be derived from the various alternatives. All potential impacts are dismissed with a generic intuitive discussion lacking any rigor in scientific or analytical support. Studies suggesting benefits from MPAs in other parts of the world are presumed to apply to California without any substantive reason for doing so. Even where scientific analyses and models exist to help understand the potential outcomes of alternative MPAs, there is no attempt to use this responsible science.

The same unfounded, yet politically attractive, conclusions that drove the MLPAL are again embraced in the EIR (e.g., that fish populations will be improved outside of MPAs even if as much as 50% of productive fishing areas are off-limits and therefore MPAs will increase fishing). The EIR makes no effort to identify or quantify relative benefits of the various alternative projects so the public and the Commission might be able to weigh the benefits with the costs and the uncertainties. Significant potential impacts included in the scoping outline are dispensed with a simple cursory review.

Although the EIR appears to be comprehensive, it seems to have been prepared under the same political conditions as the MLPAL itself - paving the way for the adoption of an MPA network regardless of the scientific analysis that could and should be done, but was not done. This illusion will certainly contribute to the public's false understanding that MPAs are protecting the oceans from the many threats it faces, but in reality the only effect will be to further curtail fishing without addressing the true impacts.

We urge revisions be made to the Draft EIR pursuant to the attached comments and that further consideration of a central coast network of MPAs be postponed until adoption of the entire project is possible. Proceeding with a small portion of what the Legislature and the statute intended to be a statewide project is in conflict with the California Environmental Quality Act.

Sincerely,  
Trustees for the California Fisheries Coalition

*Bob Fletcher*  
Sportfishing Association of California

*Jim Martin*  
Recreational Fishing Alliance

*Steve Scheiblaue*  
Alliance of Communities for Sustainable Fisheries

*Peter Halmay*  
California Sea Urchin Commission

*Diane Pleschner*  
California Wetfish Producers Assoc.

Attachments:  
Appendix 1 – Review of MLPA CEQA Impact Analysis (Section 6.1.3)  
Appendix 2 - Peer Review – California MLPA Science Advice and MPA Network Proposals

Alliance of Communities for Sustainable Fisheries

American Albacore Fishing Association

California Abalone Growers

California Lobster & Trap Association

California Fisheries & Seafood Institute

California Sea Urchin Commission

California Wetfish Producers Association

Central Coast Fisheries Conservation Coalition

Commercial Fishermen of Santa Barbara Inc.

Federation of Independent Seafood Harvesters

Fishermen's Alliance of California

Fishermen's Association of Moss Landing

Golden Gate Fishermen's Association

I.S.P. Alginates Kelp Harvesters

Kingfisher Trading Inc.

Monterey Commercial Fishermen's Association

Morro Bay Commercial Fisherman's Organization

Port San Luis Commercial Fishermen's Association

Recreational Fishing Alliance

South Central Nearshore Trap Organization

Southern CA Trawlers Association

Sportfishing Association of California

Ventura County Commercial Fishermen's Association

For further information,  
contact Vern Goehring,  
CFC Manager

# Appendix 1: Review of the MLPA CEQA Impact Analysis (Section 6.1.3)

Dr. Richard H. Parrish  
In collaboration with the California Fisheries Coalition  
December 28, 2006

## SUMMARY

Title 14 Notice of Proposed Changes in Regulations states:

“The Commission must determine that no reasonable alternative considered by the Commission, or that has otherwise been identified and brought to the attention of the Commission, would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action.”

*Fish and Game Commission, Oct 31 2006.*

O-7

The purpose of the Environmental Impact Report (EIR) is to analyze potential environmental effects of the Central Coast MPA Project, in compliance with the California Environmental Quality Act (CEQA) requirement for agencies to consider and disclose environmental consequences of proposed projects before taking action, mitigate negative impacts, if possible, and discuss potential alternatives that would avoid or reduce identified project impacts.

O-8

This review will demonstrate that this EIR failed to consider significant information presented both to the Commission and to EIR preparers during scoping, regarding annual quotas which currently regulate fished stocks and displaced fishing effort precipitated by the proposed action.

By adopting rather than evaluating the inadequately analyzed assumptions the Science Advisory Team (SAT) used in developing its MPA guidelines, by failing to consider adult movement, protection levels and the population dynamics of the major components of the California Current Ecosystem, and by further failing to consider both the full extent of productive habitat proposed for closure and the environmental impacts of effort displacement, much less other alternatives that would reduce these impacts, this CEQA analysis is incomplete, inaccurate and its findings are fatally flawed.

O-9

For example:

- The CEQA analysis claims that MPAs are four times as ‘productive’ as fished areas.
- The EIR claims that catches will improve outside MPAs even with up to 50 percent of the productive fishing area closed.
- The EIR analysis assumes that total fishing effort will be unchanged for the large majority of species that are managed with annual quotas.
- It claims that all of the proposed MPA networks will improve fishing outside MPAs.

BUT

- EIR preparers did not consider that virtually all of the fished stocks are managed by quotas or maximum harvest caps, thus the build-up of fish inside MPAs will be offset by increased fishing mortality outside, resulting in no net gain in biomass. Moreover, the concentrated effort relocated outside the closed areas is likely to cause environmental impacts unless fishing effort is further reduced.
- The EIR mistakenly assumes that all species will exhibit massive spillover from MPAs (even sedentary species).

O-10



CEQA reviewers failed to assess the reasonable alternative that current precautionary fishery regulations, including annual quotas on fishing, in fact contribute significantly to achieve the primary MLPA goals of maintaining ecosystem function and biodiversity, and that this alternative would be as effective and less burdensome, and less costly to enforce and monitor, than the proposed action.

O-11

The MLPA simply requires “more than one” marine reserve to protect “representative habitats” in each biogeographical region, identifying seven key habitat types. The SAT guidelines, however, recommended creating 3 to 5 replicates of 20 habitat types in MPAs. The proposed project results in 18-21 replicates of some common habitats within the study region, which may extend to 40-60 replicates when the entire northern bioregion is completed. The EIR does not evaluate the additional impacts caused by the excessive number of replicates.

O-12

The EIR further failed to acknowledge a significant scientific finding highlighted in the Hilborn, Parrish, Walters review of the MLPA science advice and network proposals, copies of which were provided both to the Commission and to CEQA reviewers:

“...the primary determinant of the status of fish stocks and the health of the marine ecosystems will be the catch regulations imposed by State and Federal agencies, particularly in relation to biological diversity and marine ecosystem function, which depend substantially on species too mobile to be protected by reserves. The current pattern of State and Federal closures, gear restrictions, limited entry and catch reductions imposed along the California coast will be far more important than any of the proposed MPA plans.”

*(Appendix 2, page 10)*

O-13

In fact, this EIR failed to consider or model the population dynamics of the major components in the California Current Ecosystem, including juvenile and adult dispersal as well as larval transport. It failed to make any evaluation of the relative merits of the SAT’s several protection levels. It failed to evaluate the ecosystem benefits of current precautionary fishery regulations, including the thousands of square miles now placed in equivalent MPAs (for example: 3.8 million acres designated as Essential Fish Habitat in federal waters of the central coast, representing 67 percent of the biodiversity hotspots in the study area, closed to bottom trawling to protect biodiversity). This failure could lead to selection of MPAs that will have limited additional ecological benefits but excessive, burdensome socio-economic impacts on individuals and central coast communities.

O-14

Finally, and most importantly, the EIR simply assumes, without any analysis, population modeling or even reference to supporting publications, that “enhanced production within reserves can more than compensate for the effects of fishing effort displacement outside of reserve areas as high as 50% of the region.”

O-15

**These significant failures, among others discussed below, resulted in an incomplete, inaccurate and fatally flawed environmental analysis. This EIR does not provide adequate information for the Commission to make an accurate or effective determination as required by law.**

O-16

## REVIEW OF EIR AND CEQA ENVIRONMENTAL IMPACT ANALYSIS

The CEQA impact analysis on biological resources (section 6.1.3.1) is entirely dependent upon a narrow and entirely inappropriate view of the concept of spillover. The analysis is worded in a manner that suggests that the preparers of the EIR are unable to distinguish between the productivity and abundance of a biological resource. The assumptions used in the analysis and the total lack of any analysis or modeling of the potential adverse environmental effects of the MPAs on areas outside of the networks clearly demonstrates that the preparers of this impact analysis do not have an adequate background in ecological or fishery mathematics, resource modeling or ecological theory.

O-17

The impact analysis needs to be entirely re-done to achieve a balanced analysis of the three major factors that will determine ecological impacts of the very extensive arrays of marine protected areas (MPAs) proposed under the Marine Life Protection Act (MLPA).

1. Movement of juveniles and adults within and between MPAs and between MPAs and the rest of the habitat, (spillover and spill-in).
2. Movement of larvae within and between MPAs and between MPAs and the rest of the habitat, (larval transport)
3. The effect of protection levels on the abundance, productivity and diversity of marine organisms.

The eventual success of any network of marine protected areas (MPAs) will be determined largely by the movement of animals in and out of the MPAs, the protection levels of the MPAs and the protection levels outside the MPAs (i.e. fishery regulations). The treatment of these extremely important topics by this EIR and CEQA analysis as well as by the MLPA Initiative staff and Science Advisory Team (SAT) is simply inadequate. The SAT did develop an analytical model to assess the movement of larvae, although it was not used in final SAT evaluation of MPA network proposals; but the model provided no analysis of the movement of juveniles or adults. In contrast, the EIR made no analytical analyses at all and it based what it calls an impact analysis exclusively on an assumed movement of adults from inside the MPAs to outside. Neither the EIR nor the SAT made any attempt to assess or quantify protection levels assigned to marine conservation areas, and neither made any attempt to assess the MPA networks in relation to the historical, current or projected protection levels outside of the networks, including the conservation value of existing fishery management. In fact, the SAT was directed to ignore fishery regulations.

O-18

Scoping comments submitted prior to the preparation of the EIR stressed that both types of movement need to be addressed in the environmental impact analysis. In addition, the Hilborn, Parrish, Walters review of the SAT's work that included models, based on the larval approach used by the SAT, but expanded to include the movement of adults and assessment of several protection levels outside of the MPA networks, was provided to the CEQA staff. A research paper describing the models developed in this review and their implications has recently been accepted for publication in the Canadian Journal of Fisheries and Aquatic Science.

The expanded models mentioned in the above review were run for a number of central California fish and shellfish species with differing larval transport distances, adult movement and fishing levels outside of the MPA networks. The models show that abundance levels inside MPAs will be very

heavily affected by protection levels outside of the MPAs and that most of the MPAs in the proposed networks were too small to provide much protection to any species that has even moderate (i.e. 2-10km) adult movement. **The models sharply contradict the EIR conclusion that massive spillover will occur in all species.**

O-18  
Cont.

The principal difference between the three proposed MPA networks concerns their protection levels. According to the regulatory notice, the California Fish and Game Commission is required to make a determination of the relative merits of the project alternatives based on the following bottom line.

“The Commission must determine that no reasonable alternative considered by the Commission, or that has otherwise been identified and brought to the attention of the Commission, would be more effective in carrying out the purpose for which the action is proposed or would be as effective and less burdensome to affected private persons than the proposed action.”

*Fish and Game Commission: Oct 31 2006*

O-19

This CEQA analysis, as well as the numerous reports developed by MLPA Initiative staff, the SAT, Blue Ribbon Task Force (BRTF) and the Department of Fish and Game (DFG) during the central California stakeholder process, provide no analytical information concerning the effect of different MPA sizes, locations or protection levels on the area inside or outside of the several MPA networks. **How will the Commission assess the relative effectiveness and burdens associated with the major difference in the proposals if such analysis is not provided for its consideration?**

Movement of juveniles and adults within and between MPAs and between MPAs and the rest of the habitat, (spillover and spill-in).

The mechanism used in the CEQA impact analysis to assess the “Adverse Impacts on Marine Species Populations and Habitats Outside MPAs from Displacement and Congestion of Fishing Effort Outside MPAs” “relies almost exclusively on the concept of spillover.

Spillover is a term used to describe fish moving from within an MPA to outside of an MPA; often it is the fish caught outside that are considered to be of the most importance. MPA discussions usually use spillover to describe fish that grow to a harvestable size inside of an MPA and then move outside where they are exposed to fishing. Strangely, there is no term to describe the movement of fish into MPAs (i.e. spill-in), and the CEQA analysis entirely ignores movement of fish into MPAs in their analysis.

O-20

According to the CEQA assessment, spillover from MPAs is so large that this factor alone will prevent any loss of catch in any species, in any habitat, due to MPA networks that include as much as 50% of the habitat. In fact, according to the impact analysis, spillover is so large that it will produce a beneficial impact large enough to outweigh the increased fishing pressure outside of the MPAs, and it will do this for any species, in any fishery, in any habitat.

**This outrageous conclusion was made without reference to a single California species and without any modeling to assess the potential for spillover of species with differing mobility, different sized home ranges or different migratory behavior. It was made without any reference to the size and shape design characteristics of any of the MPAs in any of the proposed networks.**

The stated goals of the MLPA emphasize protection of ecosystem function, biodiversity and representative habitats, among other things. During the central coast MLPA stakeholder process it was repeatedly stressed that the MLPA was not about enhancing or maintaining fisheries, although the law states: MPAs and sound fishery management are complementary components of a comprehensive effort to sustain marine habitats and fisheries, and legal interpretation states that MPAs should be designed on a backdrop of existing fishery regulations.

Without description or analysis of any existing fishery regulation, the CEQA impact analysis suggests that the effects of MPAs greatly exceed traditional fishery management practices, and that spillover from the MPAs will exceed the losses in fishery yield outside of the MPA network even if the network contains 50% of the habitat in MPAs. It should be noted that the loss of fish from an MPA through spillover is a good indicator that an MPA will not achieve pre-exploitation abundance levels or age structures for the species spilling over. So in effect, spillover is a good indicator that an MPA is failing to meet its ecosystem, heritage and diversity goals.

O-21

A major error in EIR assumptions is that MPAs will not reduce the densities of fish outside of the MPAs. As stated in the Hilborn et al MLPA review:

“When fishery management includes quotas, the use of MPAs will not reduce the volume of fish taken; it will only change the geographical distribution of the take. It does not require a complicated population model to know that the increase in biomass inside of MPAs will be roughly balanced by the decrease in biomass outside.”

*(Appendix 2, page 35)*

YOU CANNOT HAVE YOUR FISH AND EAT THEM TOO.

Why is the EIR mistaken with regard to spillover?

**The EIR makes invalid assumptions about spillover rates; it ignores density-dependent factors and it uses inappropriate mathematics in an attempt to show that spillover will increase the catch of exploited fishes outside the MPA network.**

The EIR simply assumes that all species have the particular type of movement that could enhance abundance levels outside of the MPA network. Species that are most likely to have the type of spillover that the CEQA analysis envisions would be expected to have a dispersal type of movement (no home range) with limited dispersal when immature and increasing dispersal as the animals reach and exceed the size at maturity. This would allow production achieved within the MPA to be harvested outside of the MPA. The EIR does not recognize that this same production is occurring outside the MPAs and that regulations to prevent growth overfishing have been utilized in California for at least 50 years. In other words, if it is advantageous to protect smaller fish then this should be done outside of the MPAs as well as inside. The CEQA analysis could have used traditional yield-per-recruit analyses to determine if there are species for which MPAs would have any significant improvement over present regulations that are designed to prevent growth overfishing. The fishery mathematics for this type of analysis were developed in the 1950s and the concept of protection of small fishes probably predates science.

O-22

Very few, if any, animals along the California coast have the type of alongshore dispersal pattern assumed by the EIR. Only a small percentage of the species and an even smaller percentage of the biomass of exploited species in California have the constant low dispersal distances (i.e. 0.2 to 2 km

per year) that could even approach the spillover rates assumed by the EIR. There are a number of species that have an offshore dispersal pattern that approximates the dispersal pattern used in the CEQA analysis; however the SAT's recommendation that MPAs should extend out to the edge of state waters would prevent this type of offshore spillover. In fact this recommendation was undoubtedly made to prevent the type of spillover that the EIR suggests; the SAT probably realized that significant spillover would degrade the ecosystem and diversity goals of the MPA networks.

The SAT presented information showing that marine species exhibit extremely different patterns in their movement as adults; varying from a few meters to 1000s of kilometers. Species with very limited mobility as adults, such as abalone and sea urchin, will have almost no spillover effect. Species with both migratory behavior and extensive mobility, such as hake and sardine, will have no spillover effect because they will move in and out of MPAs on a daily basis. Species with small home ranges, for example some nearshore rockfishes, will only have spillover from individuals whose small home range lies on the boundary of an MPA. For these species the spillover effect will be highly dependent upon the total size and the boundary:area ratio of the individual MPA. With MPAs of the size and shape recommended by the SAT, species with small home ranges will have very low spillover rates. However, all three of the proposed packages contain MPAs that are much smaller than those recommended by the SAT, and these MPAs may have a relatively large proportion of spillover for species with minute to small home ranges. These MPAs will therefore be of limited value in achieving the ecosystem and diversity goals of the MLPA. Of course the total spillover from these MPAs will be quite small due to the small size of the MPAs.

O-22  
Cont.

The subject of spillover and its affect on yield outside of MPAs has been an area of high controversy. Presently many scientists and other knowledgeable people agree that areas such as Central California, that have an effective fishery management regime, will not see any improvement in yields of fished stocks due to establishment of MPAs. In spite of the present controversy, neither the MLPA staff, the Department of Fish and Game staff nor the SAT made any analysis or models of the effects of juvenile or adult movement on spillover from the several proposed MPA networks. Models incorporating juvenile and adult movement were included in the Hilborn, Parrish, Walters review. The recommendation that this type of modeling should be carried out as part of the CEQA analysis was submitted during the scoping process.

#### How does the EIR show that MPAs will have Less than Significant and Beneficial Impact?

The EIR states "If one assumes the same amount of fishing pressure in the project region before and after an MPA is established, then the amount of fishing outside the MPA will increase in proportion to the size of the MPA for the species restrictions applied to the MPA. That is, the fishing that used to occur inside an MPA will be distributed outside the MPA in the remaining, non-protected area in proportion to the size of the MPA. This can be simply calculated."

Under the above assumption, effort can be simply calculated; but note that catch requires more complex calculations. In California the regulations used to manage the majority of the fished groundfish species, as well as many other fished species (i.e. CPS), are based on annual quotas, not fishing effort. (See Appendix 2.) This situation was addressed by a publication in the 1999 CalCOFI Symposium on Marine Protected Areas and the example used is for the local widow rockfish (Parrish, 1999). Figure 8 from this publication shows the relationship between fishing mortality rate (a function of fishing effort) and the size of the widow rockfish population, expressed as the percentage of virgin biomass when 35% of the virgin biomass is inside of MPAs.

O-23

Note that most of the more productive habitats have 25-90% of the available habitat in MPAs in the three MLPA proposals. The management control rule in this very simple relationship is designed to achieve an F40% fishing mortality rate (essentially this means that the population would have an average biomass that was 40% of the virgin biomass). The regulated instantaneous fishing mortality (fishing effort) with no reserves is 0.153 (the horizontal line in the graph). The vertical dotted line represents the 35% of virgin biomass that occurs inside of the MPAs. The curved line represents the fishing effort required to catch the quota when the total biomass is at different levels.

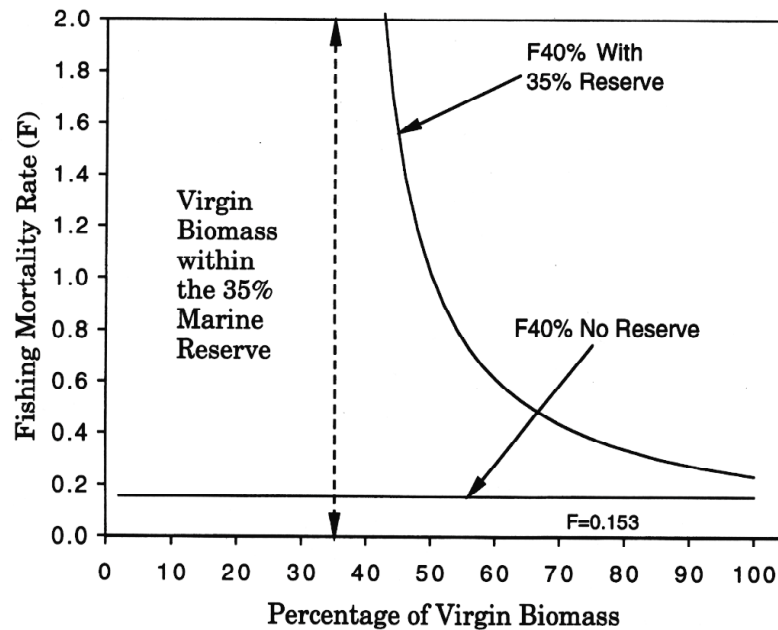


Figure 8. Widow rockfish fishing mortality rates in areas fished with and without a 35% reserve under a 40% harvest rate.

The highest observed fishing mortality rate (F) in the widow rockfish fishery was 0.45 in 1982 (Source: Table 13 Status of the widow rockfish resource in 2005). This is nearly 3 times the rate that would be required to catch the quota at the 40% target population level and no MPAs. The actual location, on the curved line, where the fishery would come to stability depends upon the economics of the fishery. If the fishery is highly efficient this stability could be at 50% of virgin biomass and approximately a fishing mortality of 1.0. Note that in this situation 15% of the biomass would be outside of the MPAs and 35% of the biomass would be inside of the MPAs and the fishing mortality rate (fishing effort) would be  $1.0/0.153$  or 6.5 times the fishing effort that would be required to catch the same quota without MPAs.

This illustration shows the magnitude of increased fishing effort and the associated adverse economic consequences **as well as the adverse environmental impacts** of fishing in the areas left open to fishing (in this case trawling) when MPAs are enacted. The widow rockfish fishery with MPAs would have a fishing mortality rate (fishing effort) that is 6.5 times that in the case without MPAs. Yet the volume of the catch would be identical. Any economic analysis based on the catch

would show that there was little economic effect of the MPAs. In contrast an analysis of the costs associated with having to fish 6.5 times as many hours to catch the same volume of fish would show enormous economic effects. **Any environmental analysis that assumes that there will be no adverse affect outside of the MPAs from the small increase in fishing under an assumed constant fishing effort would be very much in error because in this example there would be 6.5 times as much fishing effort with MPAs and it would all be targeted on the area left open to fishing.**

O-23  
Cont.

Constant fishing effort is an inappropriate way to evaluate the impact of displaced fishing for a majority of California's fisheries. In addition, the entire CEQA analysis mistakenly assumes that effort is proportional to catch and unrelated to the abundance or density of fish on the fishing grounds. **The unstated assumption that the abundance of fish on the fishing grounds will not be related to the fishing effort on those grounds simply cannot be accepted as a valid assumption.**

Another invalid assumption made by the CEQA analysis is that spillover will equal or exceed whatever losses occur due to displaced effort outside of the MPAs. How this will occur with sedentary species or species with limited mobility is not explained. How can an analysis simply assume that high levels of spillover would apply to animals like sea urchins, abalone or any fish with a small home range without any documentation?

O-24

Similarly the CEQA analysis incorrectly assumes that the production inside of the MPAs will be so large that the MPAs will have enough surplus production to sustain fisheries outside of the MPAs. The basis of this assumption involves confusion about the relationship of productivity to carrying capacity and it may involve confusion between abundance and production.

The CEQA analysis states:

"The comprehensive reviews of no-take reserve impacts suggest that production increases inside reserves worldwide show a fourfold increase (a factor of 4.00) in average production". This is much larger than the increase of production needed within the reserve, a factor of 2.18 (about 118%), cited in the example. These empirical data suggest that **enhanced production within reserves can more than compensate for the effects of fishing effort displacement outside of reserve areas as high as 50% of the region.** " (Their emphasis.)

The Scientific and Statistical Committee of the Pacific Fishery Management Council made the following statements regarding similar claims made during the Channel Islands MPA process.

O-25

"The marine reserve papers from the literature that were pivotal to the Science Panel's size recommendation consist largely of theoretical studies and a limited number of empirical studies; very few pertained to the U.S. west coast. Any assertions that marine reserves provide similar benefits on the west coast as they do elsewhere should be viewed with caution and subject to verification."

*(Scientific and Statistical Committee Report on Status of Marine Reserves Proposals for Channel Island National Marine Sanctuary Exhibit F.1.c Supplemental SSC Report, November 2001)*

"The SSC notes that, due to the relatively small scale of the CINMS relative to the full distribution of the most of the fishery resources that inhabit CINMS, substantial fisheries benefits on a stock-wide scale are unlikely to result under any of the MPA alternatives at CINMS. More

specifically, the SSC notes that the arguments for expected fisheries benefits (pp. 6-66, 6-67 and Figure 6-1) are technically weak and not compelling.”

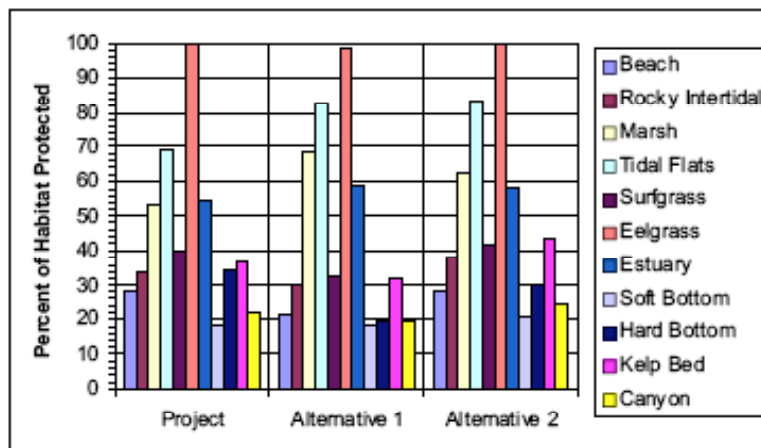
*(Scientific and Statistical Committee Report on Review of Proposal for Marine Reserves in State Waters of the Channel Island National Marine Sanctuary. Exhibit F.1.c Supplemental Report, June 2002)*

The ‘comprehensive reviews’ mentioned are not referenced in the EIR so it is difficult to know what reviews the CEQA authors refer to; however, the reviews that we are aware of concern the differences in abundance inside and outside of MPAs, not the differences in production. It is possible to derive a rough measure of production inside of an MPA if a time series of abundance is measured inside of the MPA and spillover is ignored. However, the production outside of the MPA cannot be measured by a time series of abundance because outside production must include the catch. If comprehensive reviews of the differences in production inside and outside of MPA have been made, the authors of the EIR need to prove this and provide references.

If the EIR information regarding production in MPAs is valid, we should note that the EIR appears to ignore that the marsh, tidal flats, eelgrass and estuary habitats have greater than 50% of their area in all three proposed alternatives (chart 6.1.2). Several very productive habitats have approximately 40% of their area in MPAs under Alternative 2 or the preferred alternative (rocky intertidal, surfgrass and kelp bed). Also the only habitats that have less than 30% of their area MPAs in the Project proposal are the beach, soft bottom and canyon habitats. The EIR uses an example where 15% of the habitat is placed in MPAs. **In fact, none of the proposals suggest putting as little as 15% of any common habitat in MPAs.**

O-25  
Cont.

Chart 6.1-2. Percentage of Each Habitat Type in Central Coast Region Protected under the Proposed Project and Alternatives 1 and 2



Note: Within each of the alternatives displayed on the x-axis, the colors from left to right are in the same order as displayed from top to bottom in the accompanying key.

Abundance refers to the biomass in an area, and production or productivity refers to the surplus production from that biomass (usually the annual surplus production or rate of annual production). **The increase in biomass that has been observed in numerous studies of MPAs cannot be used to determine the difference in production inside and outside of MPAs.**



The build up of population inside MPAs is simply the accumulation of annual production that occurs as a previously exploited population rebuilds towards the area's carrying capacity. It is most likely that the portion of the population outside of the MPA, in comparable habitat, had essentially the same production rate as that inside of the MPA during the first few years after the MPA was established. If the population outside remained at the same level from the start to the end of the time period then the production outside would have been equal to the catch. However, according to ecological theory, the production rate is subject to density-dependent factors. **The rate is at a maximum at low population levels and the rate declines to zero as the population approaches carrying capacity (i.e. virgin biomass).** Total production is the product of the production rate and the population size and it is generally thought that the maximum occurs when the population is at 35-50% of the virgin level; hence the Pacific Fisheries Management Council's management strategies attempt to maintain biomass levels above 40% of the unexploited level. **The expected production rate and total production from a population inside MPAs that is near carrying capacity (i.e virgin levels) would be expected to be quite small, and the MPA would therefore not be able to provide spillover of adult animals to the outside fishery at anything like the rates assumed by the CEQA analysis.**

Note that it is perfectly consistent with ecological theory that a heavily depressed stock could increase by a factor of 4 over a period of several years if it were completely protected. **However, it is very unlikely that this could be expected to occur in a single year or that the rate of increase could be maintained for any length of time.**

The west coast lingcod stock has recently shown this type of rapid growth while under a very restrictive rebuilding plan employing traditional management. The west coast lingcod population (with a calculated virgin biomass of 76,960 mt.) grew from a minimum of 10,787 mt in 1993 to 52,408 mt in 2005 a factor of 4.86 (data from the 2005 stock analysis by Jagielo and Wallace). Growth from 1999 (20,719 mt) to 2005, the period when the population was most heavily protected, had a growth factor of 2.53. This is the minimum production because the limited catch during the period must be included to calculate the average surplus production. The maximum annual surplus production (productivity) of the stock during the 1993 to 2005 period was 37% (1999).

**An important ecological concept, density-dependence, appears to be completely lacking in the CEQA analysis.** It is generally thought that a population's productivity rate increases as the stock size decreases: with low populations having the highest rates, moderate populations having moderate rates and virgin populations having zero productivity. In terms of total annual production, the maximum production is generally considered to occur somewhere between 35% and 50% of the virgin population size. Note that the production rate is dependent upon the status of the stock in relation to its virgin level. Using the lingcod example from above, in 2005 the lingcod population was at 63.86 percent of its virgin biomass. If the entire lingcod habitat were placed in MPAs the population could not be expected to grow at a fourfold rate as this would result in a population that was two and a half times the size of the virgin biomass.

**It appears that the CEQA impact analysis is based on the false premise that the fish inside of MPAs (with near virgin population densities) will be 4 times as productive as the fish outside of the MPAs (with low or moderate population densities).**

**THE IMPACT ANALYSIS SHOULD BE REJECTED ON THIS PREMISE ALONE.**

O-25  
Cont.

Movement of larvae within and between MPAs and between MPAs and the rest of the habitat, (larval transport).

This impact analysis does not address movement of larvae. This subject and its application by the SAT are highly controversial. The SAT recommendations that MPAs, with similar habitat, should be located 31 to 62 miles apart (i.e. 50-100 km) are based on larval transport theories extracted from limited studies of nearshore, mostly tropical reef, fishes. Application of the SAT's spacing guidelines is probably justified, in spite of the limited evidence and complete lack of local evidence, for only certain nearshore species in California. However, nearshore species comprise a minority of the total biomass of animals in California waters. By far the majority of the biomass occurs in epi-pelagic, meso-pelagic, bathy-pelagic, shelf, shelf-break and slope habitats.

Most of the fished species in these habitats are subjected to greater larval transport than nearshore species due to the prevailing currents in the California Current Ecosystem and the lack of nearshore circulation processes that could favor local retention. It is therefore unlikely that the SAT's spacing recommendations are appropriate for these species.

The Hilborn et al MLPA review stated:

“In reviewing the major functional groups in the California coastal marine ecosystem...it is obvious that all of the big contributors are species that are either not fished (i.e. krill and midwater fishes), are relatively mobile and have complex seasonal migration patterns, or are mainly found in deeper waters and so will be offered little, if any, real protection under any of the MPA proposals. Thus none of the MPA plans contributes very much to the ecosystem function of the region.” (*Appendix 2, page 40*)

Due to its very narrow continental shelf, a portion (approximately 65 miles) of the central California study area contains shelf-break and slope habitats. The Commission's preferred MPA network has 5 deeper water MPAs in this portion of the study area. The distances between these MPAs are approximately 6, 11, 12 and 13 miles respectively. None of these distances achieves even half of the SAT's recommended minimum spacing of 31 miles (this minimum spacing was based on the larval drift patterns of some nearshore species.)

The Monterey Peninsula to Carmel Bay area contains a major clustering of MPAs: there are 8 MPAs within 5 miles of Cypress Point. This clustering is entirely inconsistent with any of the MPA design characteristics recommended by the SAT.

The CEQA analysis should have paid special attention to displaced effort in the deep water and Monterey/Carmel portions of the proposed networks because the MPAs in these two areas fall completely outside of the SAT's recommended guidelines, and the very limited spacing between MPAs will produce far greater displaced local effort than other areas in the study region.

In fact, the maximum spacing between MPAs in any of the proposals is only 32 miles. It appears the SAT's emphasis on spacing clearly favored the “several small” approach in the SLOSS (single large or several small) MPA debate; this advice influenced all the MPA network proposals developed by stakeholders, with a heavy emphasis on protecting nearshore rocky habitat in marine reserves. Note that in the California MLPA process the SLOSS debate has become MLOMS (many large or multitude small).

O-26

The flawed analysis of displaced fishing effort also hides environmental impacts in the southern study area, where virtually all the major headlands from Pt. Sur to Pt. Conception are proposed for closure to nearshore fishing. If the proposed project is approved, it would displace effort from 30-40 percent of the most productive habitat in the area (i.e. kelp beds, hard bottom etc.). The shift of effort to less productive habitat and offshore will result in significant reductions in fished populations outside MPAs and likely an increase in bycatch of rebuilding stocks such as canary rockfish, which inhabit the offshore areas. Thus this CEQA analysis provides no accurate information to assist the Commission in decision-making.

O-27

The Commission will of course use factors other than biological or ecological guidelines to develop the final MPA network. Economic, social and cultural considerations are important. The EIR's limitations in its analysis of the special biological and ecological factors in the deep-water and Monterey/Carmel areas will make the Commission's deliberations much more difficult because the configuration of MPAs in these regions is completely inconsistent with any of the scientific guidelines. **Therefore we feel that the Commission should provide justification for abandoning the SAT's biological and ecological guidelines for the shelf-break and continental slope habitats.**

O-28

Further, this EIR contains no accurate information to assess the cumulative negative impacts to fishing communities or region from the proposed project. **The EIR's flawed findings of no significant impact, requiring no mitigation, preempted discussion of potential project alternatives that would avoid or reduce such impacts. These conclusions will lead to economic impacts far exceeding those identified in the inadequate socio-economic assessment provided as part of the MLPA Initiative.**

O-29

The effect of protection levels on the abundance, productivity and diversity of marine organisms.

The CEQA impact analysis ignores protection levels, the different levels of fishing restrictions prescribed for various MPAs, in spite of the fact that fishing restrictions are the most significant differences between the proposed MLPA networks. The SAT, MLPA staff and Department also provided no quantitative analytical information that the Commission could use to distinguish between the proposed MPA networks.

The SAT developed a classification system for fishing restrictions in marine conservation areas that sorts uses into high, moderate and low protection, then states which fishing activities would be allowed in the three classifications. The SAT provided no other information on what the classifications mean or any evaluation of the effects that the three levels would have on the MPAs. For example, does "high protection" mean that the MPA is protected at the 99%, 95% or 90% level, or that the least protected species is protected at say the 95% level?

O-30

In addition, the SAT made no distinction between the different habitats or uses within an MPA. For example, one of the MPAs allows recreational fishing from shore, and this activity would place the entire MPA into the low protection classification. How would populations on the continental shelf possibly be measurably affected by recreational fishing from shore? How would deep slope species be measurably affected by kelp harvesting?

**A CEQA analysis should identify direct and indirect environmental impacts, discuss appropriate mitigation measures and potential project alternatives. The failure of this EIR to**

O-31

**note the glaring omissions and deficiencies highlighted throughout these comments, particularly after having received significant information on these issues during scoping, means this analysis fails to meet the purpose for which it was prepared.**

**The lack of definition or any analysis of protection levels, as well as failure to assess displaced fishing effort, greatly increases the chances for selecting a MPA network that will be ineffective, or detrimental, in achieving MLPA goals, and will have significant unnecessary ecological and economic impacts. The lack of accurate information and complete analysis in this EIR it makes it virtually impossible for the Commission to determine the effectiveness and burdens of the several MPA proposals, as well as to avoid or mitigate environmental impacts.**

O-31  
Cont.

**Note:** The following peer review was previously submitted to the Department, and was included herein by the commentor as a frame of reference. A formal response was prepared by the Science Advisory Team in August 2006. This topic is not appropriate for CEQA analysis and no additional response is necessary.

**PEER REVIEW**

**CALIFORNIA MARINE LIFE  
PROTECTION ACT (MLPA)  
SCIENCE ADVICE  
AND MPA NETWORK PROPOSALS**

*Ray Hilborn, PhD*

*Richard Parrish, PhD*

*Carl J. Walters, PhD*

*May 25, 2006*

*Commissioned by:*

*California Fisheries Coalition  
1621 B Thirteenth Street  
Sacramento, CA 95814  
(916) 444-8194*

**FOREWORD**

**Introduction**

In 1999 Governor Gray Davis signed the Marine Life Protection Act into California law. Legislative declarations (**2851. Legislative Findings and Declarations**) found, in part, that (c) “coastal development, pollution and other human activities threaten the health of marine habitat and the biological diversity of California’s ocean waters.” (f) “Marine life reserves are an essential element of an MPA system because they protect habitat and ecosystems, conserve biological diversity, provide a sanctuary for fish and other sea life, enhance recreational and educational opportunities, provide a reference point against which scientists can measure changes elsewhere in the marine environment, and may help rebuild depleted fisheries.” Further, (d) “fish are a sustainable resource and fishing is an important community asset. MPAs and sound fishery management are complementary components of a comprehensive effort to sustain marine habitats and fisheries.” [Therefore], (h) “it is necessary to modify the existing collection of MPAs to ensure that they are designed and managed according to clear, conservation-based goals and guidelines that take full advantage of the multiple benefits that can be derived from the establishment of marine life reserves.”

The intent of the MLPA was to implement a Marine Life Protection Program, including a statewide network of marine protected areas (MPAs). The MLPA identified a set of goals for the Marine Life Protection Program including: conservation of biological diversity and the health of marine ecosystems; recovery of wildlife populations; improving recreational and educational opportunities consistent with biodiversity conservation; protection of representative and unique habitats for their intrinsic value; ensuring that MPAs have defined objectives, effective management and enforcement, and are designed on sound science; and ensuring that MPAs are managed, to the extent possible, as a network. The MLPA required an “improved marine life reserve component; provisions for monitoring and adaptive management; and a process for the establishment, modification or abolishment of existing or future new MPAs. Further, the MLPA called for the use of “best readily available science” in designing and managing MPAs.

In August 2004, the California Resources Agency, California Department of Fish and Game (DFG) and Resources Legacy Fund Foundation (RLFF) launched an unprecedented public-private partnership to implement the MLPA, after two earlier attempts had failed, the last attempt curtailed by DFG budget cuts. In this renewed effort, called the MLPA Initiative, RLFF-contracted staff created a master plan framework to guide the public process, including specific scientific guidelines on MPA design; established a Science Advisory Team (SAT) to develop the science advice, based on the MLPA; convened a Blue Ribbon Task Force to provide policy advice; and appointed a regional stakeholder group to develop alternative MPA proposals, beginning with an initial central coast study region.

### ***Rationale for this Peer Review***

As noted above, the MLPA declares that MPAs and sound fishery management are “complementary components” of comprehensive efforts to sustain marine habitats and fisheries. The MLPA also requires the use of “best readily available science” in designing and managing MPAs. However, the science advice provided in the MLPA master plan framework was deficient in at least three major aspects:

- It failed to consider other impacts to marine resources besides fishing (i.e. climatic variability, non-point source pollution, coastal development impacts on habitat etc.), and instead focused only on restricting fisheries.
- It failed to consider the ecosystem benefits of existing fishery management and failed to integrate existing fishery regulations and restrictions into its MPA size and spacing guidelines and analysis of MPA proposals.
- Moreover, CFC members with practical at-sea experience had serious doubts about “scorched earth” larval transport theory, as well as the assumption that fishery management was non-existent (or ineffective) outside MPAs, and desired that the science advice be given independent scientific scrutiny.

In light of those omissions, and because the MPA network proposals developed through the MLPA Initiative process pose potentially ruinous socio-economic impacts to central coast fisheries, ocean harvesters and coastal communities, the California Fisheries Coalition (CFC), a group of more than 20 ocean-dependent associations and businesses representing thousands of fishermen, seafood processors, abalone aquaculturists and allied industries, sponsored this peer review of the MLPA science advice.

The purpose of this review is to evaluate the science advice in relationship to the goals and provisions of the MLPA, with specific consideration of the ecosystem contributions of existing fishery management, as well as MLPA requirements for monitoring and adaptive management. In short, the objective of this peer review is to couple MPA science to adaptive fishery management.

The peer reviewers were contracted to perform the following tasks:

- [1] Review master plan framework science advice relative to its assumptions, best available science and Marine Life Protection Act goals:  
An MPA network covering all habitats must include both State and Federal waters. Assess habitats expected to achieve functioning MPA networks if only State waters are involved.
- [2] Review existing state and federal fishery management regulations relative to achieving MLPA goals  
Fishery management review shall include the following:
  - a. The relative lifetime fecundity (LTF) that is used by both the Council and the SAT. This will allow a comparison of the Councils standards of 40-65% of lifetime fecundity to the 0-35% used by the SAT.
  - b. The historical and recent fishing gear limitations, including existing closed areas (examples: seasonal and year-round Rockfish Conservation Area, Cowcod Conservation Area, Essential Fish Habitat area designations; no-trawl zones, no gillnet areas etc.) should be described for several habitats and species groups, with emphasis on the expected lifetime fecundity that would be expected in important species groups given present fishery management. *(This would probably be done by showing LTFs that occurred during the decline of key species (selected to show a range of habitats) vs. those that are expected with current management.)*

[3] Review SAT modeling and analysis to assess the effects of larval dispersal and juvenile and adult movement on the expected performance of MPAs in maintaining populations inside and outside of MPAs. This concept should be developed and used to demonstrate the strengths and weaknesses of MPAs for maintaining populations of exploited species and healthy ecosystems inside and outside of MPAs.

[4] Review SAT analysis of Package 1, 2R and 3R network proposals relative to meeting science advice and achieving goals and objectives of MLPA and central coast study region.

[5] Review the SAT size, spacing and protection levels relative to maintaining the diversity and abundance of marine organisms.

This review addresses the following questions:

- How well validated are the SAT assumptions and is there broad scientific consensus that these assumptions are reasonable - or "best available science"
- What is the degree of uncertainty in the assumptions
- Are there other explanations that address the same purpose?
- What is the appropriate mix of MPAs necessary to achieve the goals of the MLPA, considering existing fishery management in California.
- Assess whether the goals of MLPA are more effectively achievable, with lesser socio-economic impact, through MPAs or traditional or new fishery management tools.

*Submitted by: Trustees for the California Fisheries Coalition*

Reviewers: Ray Hilborn, School of Aquatic & Fishery Sciences, University of Washington  
Richard Parrish, NOAA Fisheries PFEL, retired  
Carl J. Walters, Fisheries Centre, University of British Columbia

Sponsor: California Fisheries Coalition

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**PEER REVIEW OF  
CALIFORNIA MARINE LIFE PROTECTION ACT (MLPA)  
SCIENCE ADVICE  
AND MPA NETWORK PROPOSALS**

## **1. EXECUTIVE SUMMARY**

As reviewers of the science advice developed from the goals and requirements of the Marine Life Protection Act (MLPA), and given the additional task to review and comment on the contributions of fishery management toward maintaining marine populations, ecosystem function and biological diversity, we take our primary role, objective and potential benefit to the process to provide advice on the best available science, integrating (largely theoretical) MPA science into existing fishery management. In that context we view ourselves as troubleshooters of possible pitfalls and gaps in the process, and how adaptive management plans could be improved to deal with those pitfalls.

### *Summary comments on the goals of the MLPA*

The first potential pitfall is the “fuzzy” language of the MLPA itself. The MLPA simply mandates protecting marine biodiversity and ecosystem function; ensuring that MPAs are designed on sound science; and ensuring that MPAs are managed, to the extent possible, as a network. The MLPA also specifies that the Marine Life Protection Program shall include, in addition: provisions for monitoring, research, and evaluation at selected sites to facilitate adaptive management of MPAs and ensure that the system meets the program’s stated goals; and a process for the establishment, modification, or abolishment of existing MPAs or new MPAs established pursuant to this program. The dichotomy between reserves to protect biodiversity and the mandate for adaptive management was reflected in the master plan framework statement, noting the distinction between fishery management closures, which function as “de facto” MPAs, and designated MPAs: the former could be reduced or abolished based on recovery of marine species, while the latter would be “permanent”, abolished only if they failed to achieve biodiversity and habitat protection. In reality, a cornerstone of adaptive management is change.

The MLPA statute provided no explicit guidance to address the “SLOSS” (single large or several small) MPA debate, but suggested that decisions on size and placement be made by a master plan team and regulatory agencies, with the involvement of stakeholders. The science guidance provided by the MLPA Initiative Science Advisory Team (SAT) clearly favored the SS (several small) approach in its interpretation of the law. The SAT advice produced a very extensive network of MPAs in each of the MPA network proposals, with a heavy emphasis on nearshore rocky habitat protected in marine reserves.

MPA proponents have commented that marine reserves, and in this case the MLPA, are largely intended to protect intact ecosystem functions and biodiversity, and are “not about fishery management.” However, MPAs and MPA networks certainly affect and are affected by fisheries and fisheries management. In fact, “de facto” MPAs such as the Rockfish Conservation Area have been utilized successfully in fishery management and also achieve MLPA goals such as restoring stocks of concern and protecting benthic habitat. Resulting from precautionary “ecosystem-based” fishery regulations enforced by both State and Federal fishery management agencies in recent years, there is now no evidence that current fishing practices upset the “natural” biological diversity of the marine ecosystem.



Further, the perception that rocky bottom fishes are presently overfished is incorrect. The SAT apparently did not consider or seriously underestimated the conservation benefits afforded by areas protected by measures other than restrictive MPAs, or marine reserves. For many species, especially those with wide dispersal patterns, the other forms of protection (e.g. existing fishery management measures) are much more effective than MPA status. For example, the enactment of MPAs will have little effect on the annual take or abundance of most groundfishes because their management includes the use of annual quotas. Therefore the annual take for these species will be the same with or without MPAs; but MPAs will determine where the fish are taken.

#### *Summary comments on the MLPA science advice*

The MLPA master plan framework science advice can be divided into discrete components:

1. Types of habitat to include in MPAs
  - The SAT advice greatly expanded specified MLPA habitat types, developing 20 habitats, and further required three to five replicates of each habitat in reserve. This increase undoubtedly contributed to the large number of MPAs (29-31) in each of the network packages.
  - The extensive use of headlands in Package 2R and 3R, in an attempt to capture upwelling centers, could be counterproductive for species with larval stages exceeding 10-15 days because these areas have extensive offshore jets that entrain larvae far offshore as a result of the Ekman spiral.
2. Size and distance between MPAs
  - The MLPA science advice recommended a collection of quantitative prescriptions about size and spacing of MPAs. It appears to us that those prescriptions were pulled out of the air, based on intuitive reasoning about larval transport and adult movement distances.
  - Relying on intuitive assessments is inappropriate when the mathematical machinery is readily available to integrate key population dynamics factors. We used mathematical models to calculate the consequences of the size and spacing and found that all proposed patterns of MPAs generally have little impact because of their small size and the relatively high mobility of adults.
3. Levels of protection provided by different types of MPAs
  - Late in the stakeholder process, the SAT devised protection levels to evaluate protection benefits of MPA proposals. This classification system resulted in four protection levels: “no take” SMR; SMCA-high; SMCA-moderate, and SMCA-low. No-trawl zones, such as the RCA and groundfish EFH areas, were graded as “SMCA-low” and not analyzed.
  - To the contrary, no-trawl areas offer protection to benthic habitat and species, the reason why hundreds of square miles in State waters and hundreds of thousands of square miles in Federal waters have been designated as “no-trawl” zones and groundfish essential fish habitat.
  - The SAT did not quantify the protection provided by different types of MPAs.

4. Evaluation of MPA proposals against criteria established in the preceding three steps
  - We found no evidence that any such evaluation was conducted, beyond simple calculations of percentage of area protected. Such calculations cannot be used as direct predictors of population and community responses over highly variable life histories.
5. Species to benefit list
  - As mandated by the MLPA, the SAT developed two lists of species thought to benefit from MPAs. The value of these lists is minimal because there was no attempt to quantify potential benefits to individual species.

We found it impossible to evaluate MPA design criteria without a quantitative evaluation of adult and larval movement and population dynamics. We built two models of these dynamics and used them in our evaluations.

Our primary finding regarding the SAT size and spacing guidelines is that the scale of adult dispersal compared to the recommended MPA placement formula is such that only species that are highly sedentary as adults will see significant increases in abundance inside MPAs. Even movements of a mile or two per year preclude development of much higher biomasses inside of reserves.

Further, we found the SAT assumption that the proposed networks would be biologically connected by larval dispersal to be illusory; only a small fraction of larvae leaving one reserve would arrive in another reserve in reserves of this size and spacing. MLPA findings speak to correcting the illusion of protection provided by the existing statewide system of MPAs. Yet the science guidance adopted as “best readily available science” appears to recommend moving from one illusion to another.

It appears the SAT implicitly assumed that there will be no fish outside of reserves, i.e. no effective management besides that offered by the reserve network. We believe this assumption is deeply incorrect; the primary determinant of the status of fish stocks and the health of the marine ecosystems will be the catch regulations imposed by State and Federal agencies, particularly in relation to biological diversity and marine ecosystem function, which depend substantially on species too mobile to be protected by reserves. The current pattern of State and Federal closures, gear restrictions, limited entry and catch reductions imposed along the California coast will be far more important than any of the proposed MPA plans.

#### *Conclusions*

We compared the MPA network packages by employing population dynamics models that account for spatial organization in recruitment, dispersal and harvest impacts, using population parameters for a range of species with different movement patterns. Based on this quantitative analysis we concluded:

1. Packages 1, 2R and 3R provide very similar results for most species;
2. Anything close to “natural” abundances inside MPAs would only be achieved for highly sedentary species (like abalone);
3. For all but the most sedentary species, positive impacts of the MPAs will be trivial compared to impacts expected from current management measures aimed at meeting low target fishing mortality rates.

For all the model tests, we found the most critical parameters *not* to be larval dispersal distances, but rather (1) adult movement rates, since these create dispersal imbalances that can extend well into MPAs, even for low movement distances on the order of one mile per year; and (2) compensatory changes in post-settlement juvenile survival rates, which determine the larval settlement necessary for adequate recruitment to both MPAs and areas still open to fishing.

We found that all of the proposed MPA network designs will have similar benefits with respect to stock status, cultural protection and recreational and educational opportunities, as well as protection of unique habitats such as estuaries and kelp beds. However, the packages differed significantly in their economic impacts, with Package 1 having the lowest impact, Package 2R the highest, and Package 3R closest to Package 2R.

Ecosystem-based management, a stated goal of California’s marine protection policies ostensibly including the MLPA, requires a provision for adaptive management (AM), but to date this MLPA process has not heeded past lessons from AM planning. It is well understood that direct input, thorough socio-economic evaluation and support from affected stakeholders are essential to insure the success of MPA programs. The SAT’s failure to consider displaced fishing effort, in addition to the absence of a thorough socio-economic assessment of impacts to fishing communities, are examples of the MLPA Initiative’s failure to achieve ecosystem-based management through this MPA program.

It is important to understand that there is little empirical evidence in the northern hemisphere to verify that marine reserves are the panacea that many have claimed. Such research is needed, and we recommend that the Fish and Game Department and Commission:

1. Implement a phased MPA network designed with a variety of MPA sizes and with an adequate long-term monitoring plan and sufficient resources to test MPA theories.
2. The fact that the baselines at long-established MPAs have not been reassessed after they had been in place for 12 years should stand out as a caution for this attempt to establish a monitoring program for the 29-31 MPAs proposed in the MLPA Initiative stakeholder packages. At a minimum, the Big Creek (and Punta Gorda) baseline should be resurveyed before any permanent monitoring program is designed.
3. Incorporate our AM and monitoring recommendations in the Adaptive Management and Monitoring and Evaluation Framework and adopt this framework as the overarching monitoring / AM policy for all MPAs in California, including the Channel Islands as well as future MPA networks on the mainland coast. (See Section 4.)

4. Recognize that there is little chance that State-implemented MPAs will contribute significantly to the maintenance of marine ecosystem function; the function of these ecosystems is largely determined by highly mobile species that will be totally unaffected by MPAs. Only widespread, effective fisheries management will insure maintenance and restoration of ecosystem function.

We concur with other reviewers who recommend that marine reserves and other protected areas should be integrated with existing and emerging management measures as part of a coherent ecosystem-based approach to management of commercial and recreational fisheries, and should not simply be layered on top of existing regulations. As other reviewers have found, the size and placement of MPAs are ultimately a policy decision.

#### *The last word*

The MLPA declares that MPAs and sound fishery management are “complementary components” of comprehensive efforts to sustain marine habitats and fisheries. The MLPA also requires the use of “best readily available science” in designing and managing MPAs. Our analyses demonstrate that the MLPA science advice fails to meet both requirements. It cannot be stated that the best readily available science was utilized when no quantitative evaluation of the impact of both adult and larval movement on population dynamics was done. Further, the SAT did not consider or evaluate existing fishery management, nor the contribution of fishery management to achieve ecosystem protection and fulfill biodiversity goals of the MLPA.

## 2. Introduction

This review was commissioned by the California Fisheries Coalition to provide an independent evaluation of the science guidance of the Marine Life Protection Act. Our process was initially for each of us to independently review the primary documents associated with the master plan framework and the Science Advisory Team (SAT) advice (Appendix C). After this initial review it became clear that it would be impossible to evaluate either the science advice or the consequences of alternative plans on the table without a quantitative model of the system. Two of us (Walters and Hilborn) independently developed population dynamics models of the central California coastline, using the standard fisheries models commonly used in the published literature on MPAs but with particular emphasis on accounting for dispersal movements of older animals and applying fishing mortality rates based on current fishery management regulations. These models will provide much of the basis for our comments below.

## 3. The nature of the “Science Advice”

To understand the science advice we must first refer back to the goals of the Marine Life Protection Act.

### 3.1. Goals of the MLPA

From the MLPA statute, the goals of the MLPA are:

1. To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems.
2. To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted.
3. To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.
4. To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value.
5. To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines.
6. To ensure that the state's MPAs are designed and managed, to the extent possible, as a network.

Measurable objectives for each of these goals were developed by regional stakeholders and adopted by a Blue Ribbon Task Force.

### 3.2. Elements of the science advice

The MLPA process has been long and complex, as has the interaction between legislation, various committees and task forces. There is no single document that provides the sum total

of the science advice. Much of the initial science advice was incorporated into the master plan framework adopted by the Fish and Game Commission; however, further changes to the science advice developed during evaluation of network packages. These additions, such as protection levels within conservation areas, are now proposed for adoption into the master plan framework.

The MLPA statute mandated that the best “readily available science” be employed and provided guidance as follows:

Sec. 2856 (a)(2)

(2) The master plan shall include all of the following components:

(A) Recommendations for the extent and types of habitat that should be represented in the MPA system and in marine life reserves. Habitat types described on maps shall include, to the extent possible using existing information, rocky reefs, intertidal zones, sandy or soft ocean bottoms, underwater pinnacles, sea mounts, kelp forests, submarine canyons, and seagrass beds.

Sec. 2857 (c)

(c) The preferred siting alternative shall include MPA networks with an improved marine life reserve component, and shall be designed according to each of the following guidelines:

(1) Each MPA shall have identified goals and objectives. Individual MPAs may serve varied primary purposes while collectively achieving the overall goals and guidelines of this chapter.

(2) Marine life reserves in each bioregion shall encompass a representative variety of marine habitat types and communities, across a range of depths and environmental conditions.

(3) Similar types of marine habitats and communities shall be replicated, to the extent possible, in more than one marine life reserve in each biogeographical region.

(4) Marine life reserves shall be designed, to the extent practicable, to ensure that activities that upset the natural ecological functions of the area are avoided.

(5) The MPA network and individual MPAs shall be of adequate size, number, type of protection, and location to ensure that each MPA meets its objectives and that the network as a whole meets the goals and guidelines of this chapter.

The science advice can be broken into discrete components:

Science Advice #1: specification of the types of habitat to be protected.

Science Advice #2: specification of the appropriate size and distance between protected areas

Science Advice #3: evaluating of the levels of protection provided by alternative types of protected areas

Science Advice #4: evaluation of each of the proposed “plans” against the criteria established in the preceding three steps

Science Advice #5: evaluation of the species to benefit list developed by the SAT.

Our evaluation will look at each of these types of science advice.

## 4. Specific analysis of science advice

### 4.1. **Science Advice #1: specification of the types of habitat to include in protected areas**

The MLPA identified eight habitat types: rocky reefs, intertidal zones, sandy or soft bottoms, underwater pinnacles, seamounts, kelp forests, submarine canyons and seagrass beds. The SAT interpreted the MLPA specification of habitats in an expansive manner, developing 20 habitat types from the eight types itemized in statute. The SAT removed the seamount habitat because none occur in state waters. Five of the alongshore habitats were measured in linear miles and the remaining 15 habitats were measured in area (i.e. sq. mi.)

The MLPA specified that similar types of marine habitats shall be replicated in more than one marine life reserve in each biogeographical region. Based on recommendations from the Blue Ribbon Task Force and Department of Fish and Game, it was established that the northern bioregion extends from Point Conception to the Oregon border.

The large increase in habitat types undoubtedly contributed to the large number of MPAs in each of the packages, as replicates were required for each habitat type, and the spacing guidelines were applied to each replicate habitat type. Midway through the MLPA Initiative process, the SAT realized that the spacing guidelines could not be applied to the six deepwater habitats due to the fact that the shelf break seldom occurs within state waters. In addition, for part of the stakeholder MPA negotiations, three oceanographic-based habitats were included on the habitat list: freshwater plumes, larval retention areas and upwelling centers. The first two were quickly dropped by the SAT, but upwelling centers remained a major consideration until nearly the end of the process.

Recent analyses describe four upwelling centers in the California region (one extending southward from each of the region's major promontories: Cape Mendocino, Point Arena, Point Sur and Point Arguello (Pickett and Schwing in Press, Pickett and Paduan, 2003)). Due to the documented large scale, upwelling centers were finally dropped from the habitat list. However, this did not occur until two of the three final MPA packages had already sited most of the MPAs at major and minor headlands, where upwelling centers were originally considered to occur.

The entire central California region is within the California Current's region of maximum upwelling (Parrish, Nelson and Bakun 1981); therefore, offshore dispersal and loss of pelagic larvae is of particular importance for benthic species. We note that the extensive use of major headland areas (i.e. Point Sur) for MPAs could be counterproductive for species with pelagic larval stages exceeding 10-15 days because these areas have extensive offshore jets which entrain nearshore waters far offshore.

One way to achieve a balanced network would be to include roughly equal percentages of common habitats; rather than take this approach the SAT favored placing MPAs in shallow rocky bottom habitats. The stated reasons included the idea that these habitats have high species diversity, high productivity and because fishes that live in these habitats were considered by some to be more susceptible to overexploitation. The impression that some

habitats are more deserving of protection, and the fact that no numerical guidelines (or empirical data) were available to determine how much area in reserve is enough, resulted in the stakeholders placing 30-100% of many habitats in MPAs. Alterations of this magnitude will cause severe changes in the distribution of fishing effort. If such an extensive MPA system were implemented, it is likely that fisheries would not be sustainable on the reduced habitat area unless additional corrective fishery management actions were taken.

### 4.2. **Science Advice #2: specification of the appropriate size and distance between protected areas**

The SAT made specific recommendations regarding the size and spacing of reserves. This advice was based on two guiding principles. First, reserves must be large enough to encompass the normal movement of adult individuals, so that there is a true "reserve" effect. If reserves are too small, then there will be little build up of abundance within the reserves. Secondly the distance between reserves will be determined by larval dispersal distances. If reserves are too far apart then larvae from one reserve will rarely disperse far enough to "network" with the closest other reserves.

As the SAT noted, any specific MPA design will be a compromise for a range of different species. For the species of interest, some will have very sedentary adults and larvae, others will be reasonably sedentary as adults but have highly dispersive larvae, and some will have both adults and larvae with large amounts of movement.

The SAT provided guidelines on both size and distance based on literature about adult movement and larval dispersal distances. Evidently no quantitative population dynamics models were used in that evaluation, since the construction of such models leads immediately to strong concern about issues like compensatory mortality of post-settlement juveniles. These issues were not highlighted as critical uncertainties in the SAT discussions. It is our understanding that Dr. Loo Botsford had worked on such a model, but the model was not used in the final SAT advice, nor in the SAT analysis of MPA proposals.

In an effort to help us understand the consequences of alternative MPA designs, and to understand the SAT MPA design criteria, we constructed two models, described in Appendices A and B. These models make very standard assumptions about fisheries life history and dispersal, and we understand these are broadly similar to the model Dr. Botsford was constructing. The models differ in complexity: Appendix A model predicts only abundance; Appendix B is fully age-structured so as to account explicitly for effects of fishing on factors such as mean fecundity. These models allow us to determine what predictions are robust to particular model assumptions.

MLPA planning documents, specifically the science advice incorporated in the MLPA master plan framework, have recommended a collection of quantitative prescriptions about how large MPAs need to be and how they should be spaced along the coast. It appears to us that those prescriptions were pulled out of the air, based on intuitive reasoning about larval transport and adult movement distances of various organisms. Considering the substantial economic and social costs posed by MPA establishment, relying on such intuitive assessments is not appropriate when the mathematical machinery is readily available to

integrate key population dynamics factors and processes into models that will give at least some feeling for likely quantitative consequences of various dynamic rate processes acting together. The best readily available science is the use of quantitative models.

The models described in Appendices A and B illustrate some of the pitfalls and problems of MPA design discussed below, such as dispersal imbalance effects on density patterns in MPAs and increased fishing impacts outside the MPAs when fishing effort is displaced. One of these models (Appendix A) is relatively simple, examining only changes in total numbers of animals. The second (Appendix B) is a much more detailed age-structured accounting system, allowing evaluation of age-related management policies such as changes in size limits. Both models are implemented in spreadsheets that should be relatively easy for various California stakeholders to use for broad comparisons of how alternative MPA plans might impact species with different life histories. By comparing results from simple versus detailed models, it is relatively easy to see what predictions are robust to the details of model formulation.

From the results of our modeling, and indeed almost all other MPA models that have been published, we find very little basis for the specific MPA size and distance criteria the SAT developed. Worse, the modeling results indicate a strong possibility of a “win-lose” outcome for non-consumptive versus consumptive users, due to reduced fishery yields compared to what could be obtained with effective fishery management.

As our models show, given the average distances moved by adults, “tagging studies indicate that net movements of many of California’s nearshore bottom-dwelling fish species, particularly reef-associated species, are on the order of 5-20 km (3-12.5 m or 2.5-11 nm) or less over the course of a year (MLPA master plan framework page 40)”, the SAT has greatly overestimated the amount of build up of adults within reserves of the size they recommended. For a species that moves, on average, two miles per year, with a 15% natural mortality rate (not particularly long lived), we expect to see very little adult build-up within reserves. The situation for shelf and slope fishes, with higher adult movement rates than the nearshore fishes, would be expected to be even less. The implications in the SAT advice that these reserves will produce large, nearly unfished population sizes is not supported by any quantitative analysis. The reserves would have to be very much larger to achieve significant increases in abundance within the reserves; this concern was in fact recognized by the SAT in their discussions about the SLOSS (single large versus several small) debate in MPA design, but the size and spacing recommendations favored the SS side of the equation.

SAT advice regarding the impact of different spacing levels is similarly not supported by quantitative analysis. If the average larval dispersal distance is on the order of 40-100 km, then only a very small fraction of the larvae dispersing from one MPA will randomly land in another MPA. The vast majority will land outside of other MPAs, thus these MPAs will not be well connected in any biological sense. It is certainly true that if the MPAs are too far apart there will be almost no larval connection, but the quantitative modelling shows that there is almost no population level impact of connection. If there is truly no larval production outside of MPAs, then each MPA will effectively be an island, and those larvae that do land in other reserves will represent a small fraction of the total dispersal, and will not

result in natural levels of recruitment within the MPA unless there is a very strong compensatory increase in juvenile survival rates after larval settlement.

Fortunately, under current conditions, the majority of larval production will come from outside of MPAs. Even for stocks that are currently fished down to 10% of virgin biomass, the larval production that will come into MPAs would represent perhaps a minimum of 20% of the maximum possible larval production (using the spawner recruit assumptions in the NOAA stock assessments), so even if 20% of the total area was protected, and stocks rebuilt to virgin abundance in those areas, the larval production from outside the reserves would equal the larval production from inside the reserves.

The exceptions to the above case would occur in very limited habitats where all of the Packages placed almost the entire habitat in MPAs (i.e. eelgrass), and limited habitats where a majority of the area was placed in MPAs (i.e. coastal marsh, estuary and tide flats). In addition, Packages 2R and 3R exceeded the SAT guidelines by placing 30-49% of several nearshore habitats in MPAs (i.e. rocky shoreline, surfgrass, average kelp, persistent kelp and 0-30 m hard bottom).

Most stocks of interest are far above 10% of virgin biomass, and under PFMC rebuilding plans these stocks are all rebuilding toward 40%. Thus the fundamental theory of the SAT, that larval connection between MPAs is essential to meet the objectives of the MLPA, is flawed both because the SAT’s advice on distance does not provide for real connection, and such connection is unnecessary because there is significant larval production outside of reserves.

The entire theoretical basis of “networking” disappears when one resolves to manage fish stocks outside the reserves to maintain an adequate level of larval production, and thus the question reverts to a SLOSS debate from the pure conservation perspective.

There are two issues with respect to conservation:

1. How much area to put in reserves?
2. Where to site them?

Given that the objectives of the reserves are largely for protection of biodiversity, more is obviously better, but there is a general trade off of more reserve area negatively impacting long-term sustainable extraction, and thus there is really no right answer, it depends on the societal trade-off between harvesting and large protected populations.

It is obviously important to have significant portions of representative habitats protected, as in wilderness reserves, but some types of habitats may be “fully utilized”, that is someone is fishing them. This is where the true conflict occurs, and we suggest the following:

First: accept that the amount of area protected in the “fully utilized” habitats will be less than the overall average; it may be possible to get 50-80% of the habitats that are never fished protected, but accept that only 5-10% of fully utilized habitats are protected.

Second: identify where the lowest conflict areas will be: obviously remote and hard to access sites will cause the lowest conflict, so select those for protection.

Regarding reference sites, the purpose of reference sites is to provide an idea of the abundance of fish in the absence of fishing and to provide “controls” on recruitment trends. Given the estimated larval dispersal rates of tens of kilometers, and the fact that in practice we are not going to see any reserves that are much larger than the dispersal rate of larvae, we doubt that any reserve design will provide controls on recruitment trends; there is too much larval mixing. So again there is really no role for networking with reference to this goal. It also means that the main purposes of reference sites are simply to get an idea of abundance in the absence of fishing and potentially as controls on changes in adult mortality.

A final serious flaw in the SAT advice on this point is that for most species, the MPAs in state waters will protect only a small fraction of the spawning stock biomass. Achievement of the goals of the MLPA will be largely determined by fisheries regulations in federal waters, yet the SAT advice regarding size and spacing of reserves took no account of existing, pending and future fisheries regulation.

#### **4.3. Science Advice #3: evaluating of the levels of protection provided by alternative types of protected areas**

Three different classes of MPAs were used in the MLPA process: marine reserves (SMR) where no take is allowed, marine parks (SMP) where some or all recreational take is allowed but commercial take is prohibited, and marine conservation areas (SMCA), where some or all recreational and some commercial take is allowed. The MLPA, the master plan framework and the SAT provide virtually no guidance regarding the situations where these different types of MPAs should be used, and the SAT did not indicate how the several types of MPAs should be evaluated under the SAT guidelines at the beginning of the MPA design process. Late in the stakeholder process, the SAT devised three protection levels for marine parks and conservation areas to assist in evaluating of the relative protection to sedentary benthic species provided by marine parks and conservation areas with differing allowed take. Particular emphasis was placed on harvest of pelagic species in waters deeper and shallower than 50 meters, trap fisheries for crab and spot prawn, different harvest methods for kelp and power plant intakes and discharges.

This classification system resulted in four protection levels (SMR, SMCA-high, SMCA-moderate and SMCA-low); however, other than simple bar graphs of the percentage area in the differing protection levels, the SAT did not provide any quantitative descriptions of the protection provided by areas with differing protection levels. For example they could have defined high, moderate and low protection as having all species at 90%, 70% and 50% of their unfished levels. They did not describe how many species have to be taken at a given level to reduce the protection level classification. This failure to quantify the reduction in protection to sedentary benthic species caused by fisheries directed at other species makes it impossible to compare the several packages whose differences to a large degree are based on different protection levels. In addition, the SAT made no attempt to quantify the percentage of an MPA that was impacted by the protection level. For example, an MPA might have a very low percentage kelp habitat; however, if kelp harvest was allowed in this small area, the

whole MPA out to three miles was assigned the same reduced protection level. As a result, the number of MPAs was increased without any increase in protection. For example, the several Point Buchon configurations have a reserve near shore and a conservation area that allows fishing for salmon, and in some cases albacore, offshore. This is the same protection that would occur with a single conservation area that allowed fishing for salmon (and albacore) offshore of some depth or longitude line. However, due to the undocumented SAT constraint, the stakeholders were prevented from using the simpler MPA configuration to avoid assigning the lower protection level to the entire MPA. Another constraint was the statute requirement for replicate (more than one) reserves for each specified habitat type.

Assessment of the levels of protection is greatly hampered due to the failure of the SAT to provide any context for their protection levels. There is no evidence that the SAT based their protection levels on any given fishery management regime; although so called ‘scorched earth’ fishery management was discussed in SAT meetings. Present Pacific Coast groundfish management is designed to maintain population biomass above 40% of the unfished biomass, and lifetime fecundities are to be maintained at 40 to 50% of unfished levels (depending on the species). In the context of present fishery management, MPAs that fall within the SAT’s ‘low protection classification’ should produce biomass densities of sedentary species that are well above those presently deemed sustainable. However, the SAT analysis of MPA packages considered only SMR, SMCA-high (salmon fishing only) and SMCA-moderate (salmon and one other fishery, for example, salmon and spot prawn). The SAT graded the “no trawling” areas as SMCA-low and did not consider the benthic protections provided by the RCA and groundfish essential fish habitat areas, which now encompass hundreds of square miles in State waters and hundreds of thousands of square miles in Federal waters along the west coast.

#### **4.4. Science Advice #4: evaluation of each of the proposed “MPA plans” against the criteria established in the preceding three steps**

We see no evidence that any such evaluation was conducted, beyond simple and not very helpful calculations of percentages of area protected and degree of protection afforded by alternative MPA types (reserves, parks, conservation areas). Such calculations cannot be used as direct predictors of population and community responses over highly variable types of life histories.

To assess the effects of the several packages we developed two spatial models. The simpler model (described in Appendix A) was run with a constant habitat array and with a variable habitat array based on an assumed relationship with habitat quality based on the spatial distribution of fishing effort on rocky bottom.

The constant habitat simulations were run with fishing mortality rates based on current stock assessments and with rates approximating the rates that existed in the 1980s and early 1990s (Figure 4.4.1). The results from these simulations show that abalone has a moderate increase in total abundance in comparison to the situation with no MPAs; abundance increases and catch decreases with increasing area in MPAs (Table 4.4.2.).

The fishes show remarkably little increase in abundance with any of the MPA networks; however, cabezon (which has the least adult movement of the species used) has a small increase in abundance and a small decrease in catches. In the simulations with fishing mortalities based on a successful fishery management regime, the increases in local abundance inside the MPAs is largely offset by the reduction in local abundance outside of the MPAs. Abalone, due to its very limited dispersal both as larvae and adults, differs from the other species in that the total abundance is considerably higher and the catch considerably lower with MPAs. In all species the abundance levels are heavily determined by the fishery management outside of the MPAs (Figure 4.4.1).

Table 4.4.1 Model parameters used in simulations.

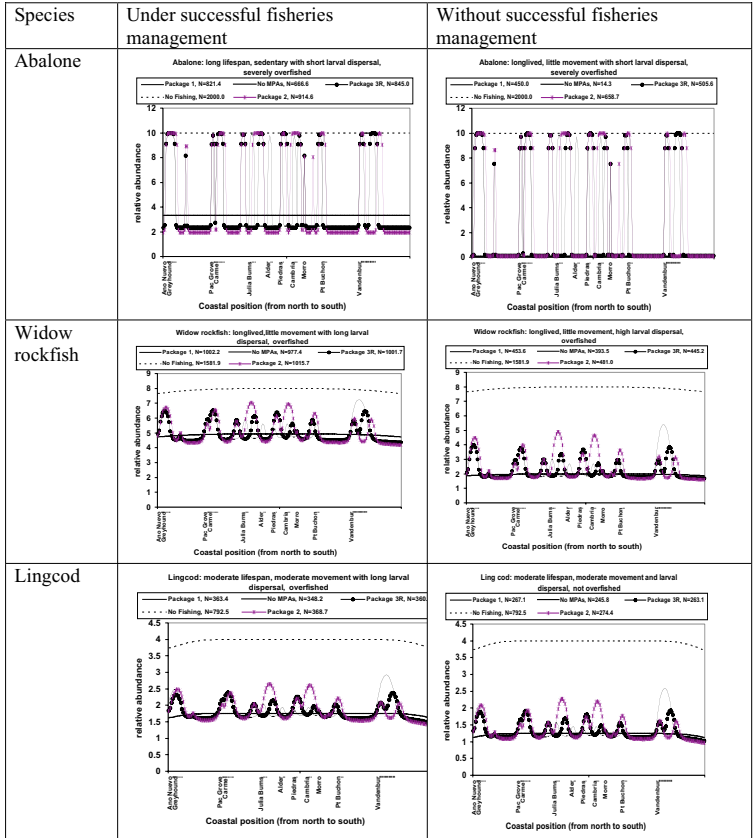
Simple model parameters	Abalone	Widow rockfish	Lingcod	Boccacio rockfish	Cabezon
Base recruitment ( $R_0$ )	1	1	1	1	1
Annual "adult" mortality ( $M$ )	0.1	0.125	0.25	0.15	0.3
Fishing mortality rate ( $F$ ) successful management	0.08	0.07	0.25	0.056	0.2
Fishing mortality rate ( $F$ ) unsuccessful management	0.2	0.3	0.4	0.3	0.4
Adult emigration rate (~mi/yr)	0.01	1	6	6	1.5
Larvae per adult ( $k$ )	100	100	100	100	100
Goodyear compensation ratio ( $K$ )	3	20	10	4	10
Larval transport distance parameter ( $S$ )	0.3	40	15	45	1.5

Figure 4.4.1. (on page 22)

Predicted equilibrium patterns of relative abundance for a selection of indicator species, calculated using the spatial model with constant habitat described in Appendix A.

X-axis of the graph is geographic position, from just below San Francisco Bay at the left to Point Conception at the right. Positions of some proposed MPAs are shown to indicate position.

Relative abundance is measured in relative (per recruit) units. Note predicted abundances drop off near the "range" limits due to not accounting for dispersal of larvae and older animals into the modeled area from outside regions, but while accounting for dispersal losses to those regions. Parameter values for simulations are as shown in Table 4.4.1. The left column shows scenarios with fishing mortality rates set to target equilibrium values under current management (note that present rates on species with rebuilding plans are less than those used here). The right column shows scenarios without successful management with fishing rates set to 0.2 to 0.4 to simulate high historical fishing impact.



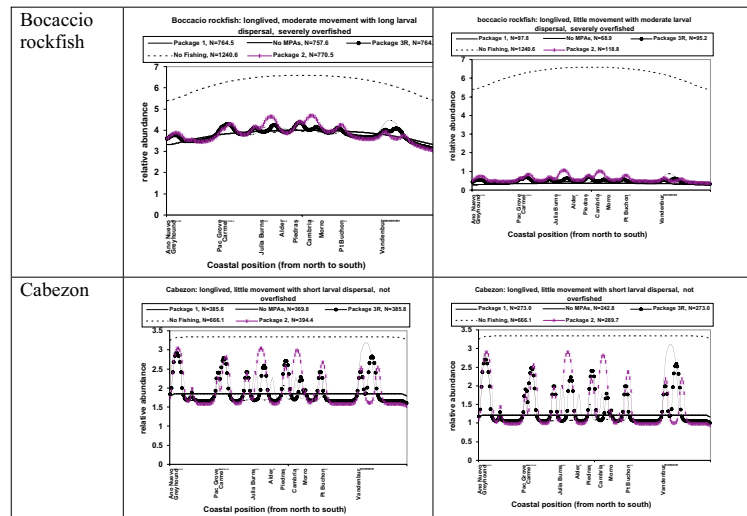


Table 4.4.2. Predictions of average abundance and response to fishing for the simple model, but without spatially variable habitat conditions; successful management (left column of Figure 4.4.1).

	Abalone	Widow rockfish	Lingcod	Bocaccio	Cabezon
ABUNDANCE					
without fishing	2000.0	1581.9	792.5	1240.6	666.1
without MPAs	666.6	977.4	348.2	757.6	369.8
Package 1	821.4	1002.2	363.4	764.5	385.6
Package 3R	845.0	1001.7	360.8	764.5	385.8
Package 2R	914.6	1015.7	368.7	770.5	394.4
CATCH					
without fishing	0.0	0.0	0.0	0.0	0.0
without MPAs	53.3	68.4	87.1	42.7	74.0
Package 1	39.7	65.8	84.8	42.2	69.7
Package 3R	37.8	65.8	85.2	42.2	69.8
Package 2R	31.9	64.3	83.8	41.9	67.5
FISHING MORTALITY (F)					
without fishing	0.00	0.00	0.00	0.00	0.00
without MPAs	0.08	0.07	0.25	0.06	0.20
Package 1	0.05	0.07	0.23	0.06	0.18
Package 3R	0.04	0.07	0.24	0.06	0.18
Package 2R	0.03	0.06	0.23	0.05	0.17

The simulations with the simple model including variable habitat show more 'reserve' effect than those with constant habitat (Figure 4.4.2 and Table 4.4.3). This is primarily due to the fact that all of the MPA packages have a larger percentage of the rocky habitat, and an even larger percentage of the best rocky habitat (i.e. kelp), in MPAs. Abalone (in the absence of sea otter populations) show increases in abundance from 13% (Package 1) to 18% (Package 2R) of the equilibrium biomass without a fishery; catch declines from 31% (Package 1) to 51% (Package 2R) from the no MPA situation. All of the other species have smaller increases in total abundance and decreases in catch. Lingcod abundance increases from 7% (Package 2R) to 9% (Package 1). The smallest increases in abundance occur in widow rockfish, 4.2% (Package 2R) to 4.7% (Package 1).

Figure 4.4.2. Predicted spatial distributions for Bocaccio rockfish, model including spatial habitat variation assumed to be correlated with spatial distribution of fishing effort. No MPAs scenario assumes successful long term harvest management to low fishing mortality rate target of 0.06. Compare fourth row of Figure 4.4.1 above.

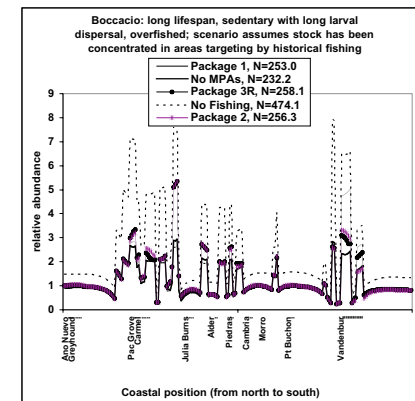


Table 4.4.3. Predictions of abundance and response to fishing for the simple model with spatially variable habitat conditions; successful management (as in Figure 4.4.2).

	Abalone	Widow rockfish	Lingcod	Bocaccio rockfish	Cabezon
ABUNDANCE					
without fishing	683.8	637.8	296.8	474.1	249.2
without MPAs	205.0	293.1	72.2	232.2	100.2
Package 1	293.4	323.2	99.4	253.0	119.7
Package 3R	317.2	322.6	95.0	258.1	122.5
Package 2R	329.6	319.9	92.9	256.3	122.8



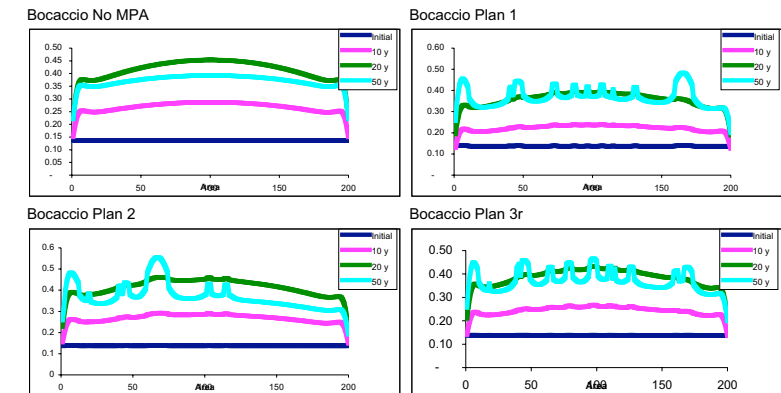
CATCH					
without fishing	0.0	0.0	0.0	0.0	0.0
without MPAs	21.1	32.2	25.1	20.8	27.4
Package 1	13.1	30.0	25.2	19.5	23.1
Package 3R	11.2	30.2	26.3	19.5	23.7
Package 2R	10.3	30.4	26.2	19.6	23.5
FISHING MORTALITY (F)					
without fishing	0.00	0.00	0.00	0.00	0.00
without MPAs	0.10	0.11	0.35	0.09	0.27
Package 1	0.04	0.09	0.25	0.08	0.19
Package 3R	0.04	0.09	0.28	0.08	0.19
Package 2R	0.03	0.10	0.28	0.08	0.19

In summary: our comparison of the MPA proposals using population dynamics models that account for spatial organization in recruitment, dispersal, and harvest impacts; using population parameters for a range of representative species found that:

- (1) proposals 1-3 give very similar results for most species;
- (2) anything close to natural abundances inside MPAs would only be achieved for highly sedentary species like abalone;
- (3) for all but the most sedentary species, impacts of the MPAs will be trivial compared to impacts expected from current management measures aimed at meeting low target fishing mortality rates.
- (4) the most critical parameters are *not* larval dispersal distances, but rather (1) adult movement rates, since these create dispersal imbalances that can extend well into MPAs even for low movement distances of order one mi/yr, and (2) compensatory changes in post-settlement juvenile survival rates, which determines the larval settlement necessary for adequate recruitment to both MPAs and areas still open to fishing.

Simulations using the full age structured model, described in Appendix B, shows the time trajectory of bocaccio (Figure 4.4.2). In this scenario there is a very low harvest rate (1%) for the first 20 years until the stock reaches the rebuilding threshold (40%  $B^0$ ), then when harvest rates are increased to their sustainable levels, differences in abundance between reserve and non-reserve areas appear. However, because the reserves are small relative to the adult movement, the build up inside reserves is not particularly significant.

Figure 4.4.3. Results for bocaccio using the dynamic fully age structured model of Appendix B. The X axis in all cases is the coastline with the north on the left and the south on the right.



Not only do the models predict very modest gains in abundance from having MPAs over the gains likely to be realized through existing and future fishery management, they further predict that such additional gains in abundance will be at the expense of fishers, in the form of reduced yields (Tables 4.4.2 and 4.4.3). This effect occurs because of depressed catch per effort in areas open to fishing, due to concentration of effort in those areas.

Model scenarios like those shown in Figures 4.4.1, 4.4.2 and 4.4.3 are not intended to be precise, quantitative predictions of distribution patterns for particular species. Detailed spatial data are not available to calibrate or test any such predictions. Rather, the scenarios are intended to provide comparative results for policy screening and for detection of “hidden assumptions” that might cause even more severe failure of predictions, based purely on intuition or simpler calculations. A serious failing of the SAT was the fact they did not use any form of quantitative model in formulating their guidelines.

#### 4.5. Science Advice #5: specification of the species to benefit list developed by the SAT.

As mandated in the MLPA, the SAT developed two lists of species that would benefit from the establishment of MPAs. The SAT engaged in considerable discussion of the merits of lists of important species of concern that would be expected to be the most benefited by MPAs vs. lists of species that occur in the area and might benefit by MPAs. The second approach was finally adopted, and the lists include both harvested and other species that may benefit from MPAs due to reduced bycatch, habitat disturbance or enhanced ecological function due to increased abundance of harvested species. There was no attempt to list species that may have detriments due to increased competition or increased predation caused

by higher population levels of harvested species in MPAs. The only common fish species specifically excluded from the list were those that are known to have extensive adult dispersal, although some species with high adult movement were included in the list (i.e. lingcod and white seabass), and some were excluded (i.e. market squid). In addition, the vast majority of small fishes were not included in the fish list (i.e. poachers, cottids, blennies, pricklebacks etc). The value of the two lists is minimal because there was no attempt to quantify the potential benefits to individual species.

## 5. Adaptive management, Enforcement and Evaluation

### 5.1. Adaptive management

The MLPA calls for an Adaptive Management (AM) planning process and implementation. However, the concept of Adaptive Management as described in California planning documents is largely an administrative or bureaucratic process advocated by recent practitioners with extremely limited case experience. As it was originally developed by Holling, Walters, and Hilborn during the 1970s and 1980s through very large numbers of case studies, the AM policy design process emphasized the critical importance of quantitative modeling, with strong scientific and stakeholder involvement in model formulation, as a critical early step in the planning process. The aim of such models is not to obtain the best policy prescription immediately, but rather to integrate available knowledge about key processes so as to identify critical gaps in information and to provide initial screening of policy options that appear unlikely to succeed due to blatant inadequacies in scale or type of impact.

Had developers of the science advice incorporated in the MLPA master plan framework followed the AM prescription, they would very likely have developed models like those described in Appendices A and B, and use of these models would have been a central feature of SAT discussions, and possibly stakeholder MPA designs as well. Discussions, particularly about scientific data needs and uncertainties, would have looked quite different. Most of the emphasis in the MLPA planning documents that we reviewed was on developing comparative information on larval transport distances and adult movements. But, in fact, the quantitative models are not all that sensitive to movement parameters; rather, the model predictions are much more sensitive to uncertainties about current and future fishing mortality rates in areas open to fishing (i.e. future fisheries management policies outside the MPAs), and to uncertainties about whether recruitment is currently limited by larval settlement or instead by juvenile rearing capacities (i.e. the “stock-recruitment” problem of whether juvenile nursery areas are currently underseeded).

For species that are currently recruitment overfished (e.g. abalone), the models predict (see Figure 4.4.1) short-term underseeding in both open and MPA areas. This implies both a much less positive impact of the MPAs than would be expected if recovery in them were dependent only on the buildup of older, more fecund animals, and a critical need to solve the recruitment overfishing problem through wide-spread fisheries management protection whether or not MPAs make some contribution to recovery. In the case of abalone, an

additional factor to consider is the presence or absence of sea otters, which are known to limit abalone and other shellfish populations in areas that they inhabit. (*Fanshawe et al, 2003*)

The MLPA process could become an important case study in Adaptive Management, but not in the way that one might hope. If the process continues on its present course, without careful attention to past lessons from AM planning, what will very likely occur is one of the best classroom examples of how not to do AM.

An obvious uncertainty in MPA planning is how much increase will be seen in MPAs of different size. If adult movement is as high as current estimates, then few species will rebuild to densities much above the level determined by fishing pressure. A good adaptive experimental design would have an explicit design of reserves of different size, and a planned evaluation program to determine if our current understanding is correct.

### 5.2. Enforcement

Reserves that are not enforced can actually do more harm than good, by attracting illegal fishing effort. This has been suspected to occur, for example, on outer atolls of the Great Barrier Reef in Australia, despite clear evidence of reduced fishing impacts on experimentally closed reefs in the Effects of Line Fishing (ELF) experiment and earlier GBR closures (Mapstone et al. 2004; Williamson et al 2004).

For severely depleted stocks where remaining individuals are spatially concentrated, it may only take modest illegal fishing effort to cause high enough fishing mortality rates to prevent stock rebuilding (small total catch does not imply small impact; what matters is the ratio of catch to stock size). For long-lived species with population dynamics similar to abalone, a 10% annual illegal fishing mortality rate can mean the difference between recovery in a few abalone generations to recovery that takes centuries to occur. Thus for such species there is a special need to provide enforcement that is close to 100% effective at stopping illegal take. This is a very tall order indeed, given the size of the California coastline and the number of people potentially willing to violate fishing regulations for valuable creatures like abalone. There has been frank admission of the severity of the problem:

“Though seemingly impressive, when compared to the more than 5,000 square miles of California State waters and the federal waters beyond, as well as California’s vast inland area, these numbers are quite small.” (California Department of Fish and Game Master Plan Framework August 22, 2005 Page 64).

The master plan framework calls for two really critical steps toward “effective and comprehensive operational ability,” namely to hire additional enforcement officers and to explore and acquire “remote observation technology and techniques.” Such technology could also make major contribution to monitoring, especially of fishing activity.

### 5.3. Evaluation and monitoring

The California MPA program will be implemented in an ecological and management setting where abundances of many species will be changing anyway due to other management

initiatives (e.g. rockfish and essential fish habitat closures, the nearshore fishery management plan; among others) and due to environmental factors. Thus the adaptive management program will be at risk of obtaining misleading “signals” about the efficacy of MPAs unless the program is carried out in the context of a careful experimental design that provides adequate control for effects other than those caused by the MPAs. The obvious experimental design to consider is the BACI (Before-After, Control-Impact), as has been used to study effects of fishing on the Great Barrier Reef (Campbell et al. 2001; Walters and Sainsbury 1990). In this design, monitoring of abundance trends would be carried out both within each MPA and in nearby outside areas (allowing for paired comparison of control and impacted sites), and over time beginning before the MPAs are established (so as to measure recovery trends over time both inside and adjacent to the MPAs). Further, the planned staggered implementation of MPAs over time, i.e. phasing, would lead to a “staircase design” (Walters et al. 1988) of treatments, permitting estimation of time-treatment interaction effects (whether impact of MPAs changes over time with changes in ecological conditions such as recovery of larval sources for juvenile settlement in protected areas, due to protection from offshore fishing effects).

The biggest danger in not having a careful BACI design is that ongoing changes due to other fisheries management initiatives will be incorrectly attributed to MPAs. It would then not be the first time that proponents of MPAs have claimed gains from MPAs that in fact may have been due to other factors entirely (Hilborn 2002).

One of the most important impediments to implementation of adaptive management has been the formidable cost of monitoring programs needed to track changes in time and space within the context of planned experimental designs (Walters 1997), as recommended in the previous section. So far, it appears that most of the planning for monitoring MLPA impacts has focused on assuring that a broad suite of ecological and socioeconomic response indicators is measured, and that is a laudable and necessary step in the monitoring design process.

It is common in adaptive management monitoring design to develop long wish lists of performance indicators that could be monitored. But when it comes time to multiply out the number of observations over the number of sites and times for which these are needed, and to assess monitoring costs, or when mock decision analysis exercises assign values to the many indicators and seek to evaluate preferences among outcomes, there is likely to be a dramatic shrinkage in the indicator set to a relatively small number of well-defined, critical indicator variables for each major area of concern (ecological status, productivity, economic performance).

In typical scientific monitoring programs, attention is focused on precise measurement of selected indicators for relatively few spatial sites, over relatively short periods of time. However, development of an effective adaptive management program calls for just the opposite, i.e. measurement of a broad indicator set, perhaps not very precisely, over a broad range of sites for long periods of time. To accomplish this, it will be necessary to look far beyond existing monitoring programs, and in particular, there will be a critical need to develop new approaches to large-scale monitoring that substantially reduce the unit costs of key measurements like changes in relative abundances.

As noted in the first section above on Adaptive Management, we generally find that participants in policy comparison exercises end up focusing on relatively few quantitative indicators in actually comparing policy options, even after claiming that they need a wide suite of indicators in order to make such comparisons. In MPA comparisons, the really critical indicators for evaluating performance are also likely to be relatively few, including time series of:

1. Density and overall stock size for a few key indicator species inside and outside of reserves
2. Biological community structure surveys that monitor simple indices (diversity, percent occurrence, etc.) for large numbers of species in particular habitats where technology is available to examine many species at once (e.g. ROV video surveys, trawl surveys).
3. Catch per effort of a few key indicator species in the major fisheries
4. Numbers of active fishing licenses, total fishing effort, and spatial distribution of effort

Two basic approaches can be used in the design of spatial sampling programs for densities, diversity, etc. The first (and most popular) is stratified random sampling, which requires detailed habitat mapping to establish the sampling strata. Results from this approach are readily interpretable from a statistical perspective (error in estimates, power to detect differences among areas and over time can be easily calculated), but the approach is logistically complex and expensive to implement. The second is transect sampling, with transects deliberately oriented across the strongest spatial gradients (i.e. from onshore to offshore, so as to deliberately cut across depths). This approach is logistically much easier to implement, but does not permit the use of traditional statistical calculations of precision and power (the observations along each transect are treated not as independent but rather as components of a single multivariate observation of spatial pattern; statistical calculations are made only on comparisons among transect totals or means). For the same amount of field effort/time, transect sampling can result in radically more precise estimates than stratified sampling, but at the risk of possible bias. For very large monitoring programs as will be required for MLPA adaptive management, the risk of bias is probably a less important consideration than getting at least transect observations at the largest number of possible sites.

There are two possible ways to reduce unit costs of monitoring so as to make it economical to monitor a large number of study sites. One is to make relatively large up-front investments in innovative monitoring technologies, such as large-scale fixed acoustic arrays and listening arrays for acoustic tags and time-lapse digital photography for measurement of fishing effort, which then have relatively low maintenance costs over time. The second is to greatly increase the number of people involved in labor-intensive methods (like visual surveys), through collaborative arrangements with people besides scientists who are knowledgeable about ocean creatures and assessment methods (e.g. fishers). In the second (and likely more practical) approach, there is a key need to develop economic incentive

systems for fishermen and others to help in information gathering (survey fishing incidental to regular fishing activity, per-dive payment for inshore visual surveys, etc.).

Two very large field programs are currently underway for evaluation of MPA impacts, one by NMFS in the Florida Keys (Bohnsack, Ault, and colleagues) and one on the Great Barrier Reef in Australia. Both of these programs are making very heavy use of visual survey transects to provide information on relative abundances and habitat patterns. Both use a small number of experienced dive teams, organized to visit large numbers of sites each year. In the NMFS case these teams are formed each year mainly of NMFS and RSMAS staff; in the GBRMP case, the teams are outside (university and private) contractors. A few such teams could be organized and trained to work along the California coast at relatively low annual cost, gathering comparable data along hundreds of dive transects each year with particular emphasis on the various sedentary species most likely to benefit from the MLPA MPA network.

For deeper waters, a key method for data collection is likely to be trawling. This can involve a mixture of scientific survey trawling and commercial fishing with onboard observers/recorders of catch composition information (like the NMFS Cooperative Groundfish Trawl Program that is beginning to provide a wealth of information about relative abundances and distributions of bottom species along the Pacific coast). Key to making such information useful is to have precise logbook information on spatial location of each shot. Given precise georeference information, data from commercial fishing and more widespread, spatially representative survey trawls (preferably by cooperating fishers) can be combined using geostatistical methods into maps of changing distribution patterns over time.

For all relatively inexpensive observation methods (e.g. visual surveys, trawling), expansion of the survey counts to estimates of overall abundance requires calibration experiments to establish the relationship between counts and total numbers of organisms actually present at sample sites. Such experiments typically involve methods such as local depletion experiments to estimate numbers of animals actually present, and typically must be replicated at a large number of sites due to high variation in the ratios of counts to actual abundances.

The California Department of Fish and Game pioneered the development of visual scuba transects for assessment of fishes in MPAs. Extensive baseline studies were established at two of the three marine reserves established in 1994. The most extensive studies were conducted at the Big Creek Reserve, where scuba transects were carried out for several years after the reserve was created. The studies included transects inside and outside of the reserve. Unfortunately the baseline surveys at the Big Creek Reserve and the Punta Gorda Reserve, in northern California, were not continued.

The fact that the State was unable to monitor even one group of fishes in three MPAs established more than a decade ago, and that the baselines at two of the MPAs have not been reassessed after they had been in place for 12 years, should stand out as a caution for anyone attempting to establish a monitoring program for the 29-31 MPAs proposed in the MLPA Initiative stakeholder packages. At a minimum, the Big Creek and Punta Gorda baselines should be resurveyed before any permanent monitoring program is designed. In addition, Packages 2R and 3R alter the present boundaries of the Big Creek Reserve. Alteration of this

reserve would be a very poor way to carry out research on MPAs, as the Big Creek baseline is the best long-term reference site on the entire California coast.

## 6. Evaluation of other forms of protection

### 6.1. *Historical fishery management regulations*

The SAT and stakeholder processes demonstrated that there is a perception that the region's hard rocky bottom areas are more at risk than soft bottom areas. This may be due to the fact that the majority of resident soft-bottom fishes and invertebrates are most efficiently harvested with gillnets, trammel nets, Danish seines, dredges, beam trawls and otter trawls and the productive sandy beach surf zone can only be efficiently harvested with large beach seines. With the exception of gill and trammel nets, which have been more recently declared illegal in State waters, all the above gear types have been illegal in most or all of State waters for more than 50 years.

The only one of these fishing gear types that can be used in central California State waters is the otter trawl, and this gear cannot be used within 3 miles of shore along most of the central coast. In addition, trawls will soon be banned from the State waters portion of the Monterey Submarine Canyon that lies within the Federal Monterey Bay essential fish habitat (EFH) closure. With the exception of the trap fisheries for crab and spot prawn, neither of which are considered to be overfished, the commercial fishery does not have the capability to economically harvest resident soft bottom fishes and invertebrates at levels that would cause these populations to fall very far below their unfished levels. Recreational fisheries on resident soft bottom fishes have never been very large in the central California area, and the recently enacted seven-month seasonal closure, reduced bag limits and the complete exclusion from waters deeper than 20 fathoms have resulted in reducing the previous small, recreational take of these species. Due to the very low historical fisheries on resident soft bottom species in the central California region, these species are presently not much reduced from unfished abundance levels; in fact, with present regulations, nearly the entire soft bottom area within State waters could be classified as a moderate protection conservation area.

The perception with hard or rocky bottom areas is quite different. Resident bottom fishes are readily taken with hook and line, and sizeable commercial and recreational fisheries have exploited these species for more than a century. In addition, the continental shelf and nearshore species were extensively fished with gill and trammel nets for several decades, and the development of the nearshore trap and hook fisheries placed additional fishing effort on the relatively small populations of nearshore species. However, the nearshore species, for which there is enough information to develop stock assessments, have not been shown to be overfished by current standards (i.e. biomass less than 40% of their expected unfished biomass). The deep-water species, that have primarily been taken with trawls, were fished at higher rates than the shallow water species, and the populations of several species were reduced to very low percentages of their unfished level.

## 6.2. State and federal response to overexploitation of bottomfishes in the 1990s and early 2000s.

In the late 1990s and early 2000s, joint action by the California Fish and Game Commission and the Pacific Fisheries Management Council resulted in the development of very strict rebuilding regulations for the six overfished groundfish species, along with sharp increases in protection for the other species. These regulations include limited entry and reduction of the number of fishing vessels (Table 6.2.1), annual harvest quotas (Table 6.2.2) prohibition on the use of gill nets in State waters and enactment of the Rockfish Conservation Area (RCA). Recreational fishing for resident bottomfishes also was severely limited in the central California region; a seven-month closed season was enacted, overall bag limits were reduced from 15 to 10 fish, overfished species have either no take or take of a single fish, anglers can only use one hook and the Rockfish Conservation Area prohibits fishing in waters deeper than 20 fathoms.

Table 6.2.1. California limited-entry fisheries.

Bottomfish trawl	Coastal Pelagic Species
Deeper Nearshore Species	Nearshore Fishery (four regions)
Drift Gill Net (shark and swordfish)	Nearshore Fishery Bycatch
Dungeness Crab	Northern Pink Shrimp
General Gill/Trammel Net	Salmon
Herring Gill Net	Sea Cumber Diving
Market Squid	Sea Cumber Trawl
Market Squid Brail	Southern Rock Crab Trap
Market Squid Light Boat	California Halibut (April 1,2006)
Spot Prawn (3 tiers)	Sea Urchin Diving

Table 6.2.2. Species and species groups managed with annual quotas.

Pacific sardine	Pacific mackerel
Market Squid	Herring
Lingcod	Pacific cod
Pacific whiting	Sablefish
Pacific Ocean perch	Shortbelly rockfish
Widow rockfish	Canary rockfish
Chilipepper rockfish	Bocaccio
Splitnose rockfish	Yellowtail rockfish
Shortspine thornyhead	Longspine thornyhead
Cowcod	Darkblotched rockfish
Yelloweye rockfish	Black rockfish
Bank rockfish	Blackgill rockfish
Sharpchin rockfish	Yellowtail rockfish
Cabezon	Dover sole
English sole	Petrable sole
Arrowtooth flounder	Other flatfish

Minor rockfish (nearshore group)	Minor rockfish (slope group)
Blue	Aurora
Brown	Bank
Calico	Redbanded
Copper	Rougheye
Olive	Shortraker
Quillback	Yellowmouth
Treefish	
Minor rockfish (shelf group)	
Bronzespotted	Chameleon
Dwarf-red	Flag
Freckled	Greenblotched
Green spotted	Greenstriped
Halfbanded	Honeycomb
Mexican	Pink
Pinkrose	Pygmy
Redstripe	Rosethorn
Rosy	Silvergrey
Speckled	Squarespot
Starry	Stripetail
Swordspine	Tiger
Vermilion	

Comparisons of the harvest rates of common central California bottomfishes with high to low population levels (Figure 6.2.1) clearly shows that recent (2004) harvest rates of overfished species (bocaccio and lingcod) are far below those of the 1980s and early 1990s and species with healthy populations also have large decreases in harvest rates (Table 6.2.3).

Figure 6.2.1. Biomass of common central California fishes relative to their biomass in 1950; or the starting point of the stock assessment.

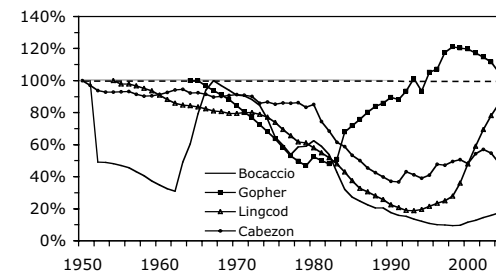


Table 6.2.3 Historical and current exploitation rates for selected species

	Exploitation Rates	
	1980-95	2004
1. Bocaccio	24.5%	1.0%
2. Gopher rockfish	4.9%	1.9%
3. Lingcod	11.9%	0.8%
4. Cabezon	12.1%	8.2%

The perception that rocky bottom fishes are presently being over fished is incorrect, and the small number of species that were over fished in the 1980s early 1990s are now under very strict rebuilding fishery management regulations; in fact one species, lingcod, was declared by the Pacific Fishery Management Council in November 2005 to be rebuilt.

### 6.3. *Inefficient management using biomass based annual quotas in combination with permanent MPAs*

The transformation in how west coast and California fisheries are managed has been primarily the result of (1) increases in knowledge of marine resources due to extensive monitoring, data analyses and modeling activities and (2) political transformation of the scientific results into effective management strategies. The principal strategy adopted was the use of annual catch quotas based on the size of populations as determined by timely stock assessments. Most bottomfishes are managed by annual quotas, and many of the species with smaller populations have been managed by habitat-based group quotas. Species that were considered to be overfished have been assigned very small quotas, and in addition, species at very low levels had large portions of their habitat placed in conservation areas where directed fishing for all bottomfishes was prohibited. In the case of bocaccio, probably more than 90% of the adult habitat in central California was closed to fishing for all bottomfishes.

When fishery management includes quotas, the use of MPAs will not reduce the volume of fish taken; it will only change the geographical distribution of the take. It does not require a complicated population model to know that the increase in biomass inside of MPAs will be roughly balanced by the decrease in biomass outside. The models used in this review are based on fishing mortality rates and do not include the increased mathematical complexity necessary to assess fisheries based on annual quotas; however, the results from these models show that the increased abundance with the MPA packages (Table 6.3.1) is associated with decreased catch (Table 4.4.2 and Table 4.4.3). Therefore, even though the abundance increases are much less than the effective areas of the habitat in MPAs, the models overestimate the reserve affect.

In the bocaccio situation, where most of the adult habitat that would be placed in the MLPA network is already inside of the Rockfish Conservation Area, fishing has already been prohibited. The results of the bocaccio model (Figure 4.4.2) clearly show that there is no additional buildup of bocaccio biomass inside or outside of the MPAs in the several Packages

until the bocaccio population is rebuilt, the Rockfish Conservation Area is opened and the fishery resumes; this is not expected to happen for several decades.

Table 6.3.1 Percentage of unfished abundance without MPAs and with Packages 1-3. Simple model with constant habitat quality (See Appendix A and Figure 4.4.1: left column)

	Area	Abalone	Widow	Lingcod	Bocaccio	Cabezon
Without fishing		100.00%	100.00%	100.00%	100.00%	100.00%
Without MPAs	0.00%	33.33%	61.79%	43.94%	61.07%	55.52%
Package 1	14.90%	41.05%	63.35%	45.85%	61.62%	57.89%
Package 3R	17.25%	42.25%	63.32%	45.53%	61.62%	57.92%
Package 2R	19.25%	45.73%	64.21%	46.52%	62.11%	59.21%

As shown earlier, the effects of the MPA networks on bottomfishes in the several Packages will primarily be dependent upon the fishery management outside of the networks (Section 4 and Appendix A). However, density-dependent factors in species life history rates will potentially cause secondary effects due the fact that population densities will eventually be considerably higher inside MPAs than outside. Unfortunately, the knowledge needed to tell if the net effect of density-dependent factors will cause increased or decreased population growth is presently not available. The alteration in the densities inside and outside of MPAs could result in overall increases in biomass if the MPAs sites are located in areas where the habitat quality produces above average population growth. The reverse is also true, and it has already been noted that Packages 2R and 3R have the majority of their MPAs located at headland locations that will have maximum offshore loss of larvae. If larval retention is a critical factor in recruitment, these packages could result in a net loss of biomass in comparison to the status quo.

We note that the SAT realized that fishery management would be the primary determinant of the abundance of species outside of the MPA network; however, as they did no modeling of their guidelines and did not consider present fishery management, they failed to realize that for the great majority of species, fishery regulations will have more effect on the populations of species inside of the MPAs than the protection provided by the MPAs.

## 7. Other comments

### 7.1. *General comments on process*

The MLPA Initiative has obviously triggered an elaborate planning process, and the participants in that process are to be commended for a thorough job of identifying ecological factors that need to be considered in design of a comprehensive network of MPAs, including SMR, SMP, and SMCA designations. As reviewers of these plans, we take our primary role, objective, and potential benefit to the process to provide advice on best available science, integrating (largely theoretical) MPA science into existing fishery management, and in that context to be troubleshooters of possible pitfalls and gaps in the planning and implementation process, and how adaptive management plans could be improved to deal with those pitfalls.

We are in general agreement that the MLPA process should proceed to implementation of an MPA network plan for the Central Coast test region; in fact, implementation is mandated by statute. Below we offer a wide variety of comments and suggestions about how the planning and implementation process might be improved, so as to insure adequate protection for species and communities prized by non-consumptive users while minimizing social and economic impacts on consumptive users (fishers).

## 7.2. Protecting the interests of ocean-dependent coastal communities as a high planning priority

The MLPA planning process pretends to aim for balanced representation of all stakeholder interests. Presumably this means picking and choosing among specific site proposals from the main interest groups, through a multi-step process that begins with regional proposals from stakeholder teams, proceeds through scientific review by the Science Advisory Team (SAT), screening by a Blue Ribbon Task Force and Fish and Game staff, and finally selection of a plan by the Fish and Game Commission.

MLPA staff and the BRTF nominally considered minimizing impacts, but in the final analysis the BRTF significantly increased impacts of package 3R – all predicated on the SAT “recommended” size/spacing advice and the perceived but undocumented need to protect headlands for birds and mammals.

While this screening process is admirable in bringing a wide variety of expertise to bear on the MPA design process, we wonder whether it is not in fact based on an inappropriate assumption that all stakeholder interests should be given equal weight or credibility in arriving at alternatives to be presented to the Commission. In particular, only one of three plans will come from fishers and harbor communities, the people whose livelihoods and community culture will be most affected by the decision. Why in the world should equal weight be given to the interests of non-consumptive users (like scientists who value in-situ biodiversity for its own sake), who have little at stake and who will bear almost none of the costs of the decision? Nothing constrains non-consumptive users from recommending unreasonable and unnecessary closures, and there is likely to be considerable sympathy for their views among the SAT members; this means that absent some explicit priority for the recommendations of consumptive users, who have first-hand knowledge of resources and habitats, the views of those users may be undervalued.

Further, recent evaluation of MPA performance, such as the work that Mike Mascia of World Wildlife Fund has done on Caribbean islands (Mascia 2003, 2004), highlights the importance of fisher participation in self-governance (design, implementation) of MPAs. Where there has not been strong support by fishers and others who derive significant livelihood from marine resources (i.e. where MPA selection has been viewed as unfair, unlikely to produce at least some value to fishers and other ocean harvesters, and/or not legitimately needed), it has been virtually impossible to enforce closures. This warning extends as well to situations where the MPA process leads to deliberate or inadvertent reallocation among user groups, e.g. from commercial to recreational users, or in the case of the MLPA Initiative, from consumptive to nonconsumptive users.

The planning process missed a great opportunity to use simple models, such as the models we present here, as a forum for different interest groups to discuss alternatives. A quantitative model has the potential to find “win-win” solutions when used in an interactive way, and to identify elements of any plan that have particularly adverse consequences to different stakeholders.

## 7.3. The pretense that MPAs will offer substantial protection for “ecosystem function” or will insure development of “intact communities”

The master plan framework recognized that ‘Ecologically dominant species play the largest roles in the function of coastal ecosystems’, however, it is apparently not recognized that the dominant species in the California Current System are almost entirely mobile and/or migratory species that would achieve almost no protection from MPAs of the size proposed in the several stakeholder packages. The smaller stocks of inshore, mainly demersal species that will benefit from MPAs certainly do depend on the more mobile species (e.g. small pelagics are important food for some benthic piscivores), but it is by no means clear that the reverse is true.

The exploited species that have biomass levels that have exceeded 1 million metric tons, MMT, (whiting, sardine, jack mackerel, anchovy and Pacific mackerel) are all highly mobile as adults and, in addition, their spawning habits and early life histories make them subject to extensive larval transport (Table 7.3.1). Species whose biomass has observed peaks between 0.1 and 1.0 MMT are mostly deepwater, continental slope species (sablefish, Dover sole, shortspine thornyhead and longspine thornyhead) or shelf-break rockfish species with schooling behavior (shortbelly, widow and yellowtail rockfishes). All except the thornyheads, whose mobility is unknown, are quite mobile and they have very extended larval and pelagic juvenile stages (18-20 months for longspine thornyhead). Species whose virgin biomass was between 0.01 and 0.1 MMT are principally shelf break and continental shelf species. All the rockfishes in this group are primarily schooling species that have considerable movement. Many of the species in this group move from inshore nursery grounds to deeper water as they mature. There are six assessments for species whose virgin biomass was below 0.01 MMT; three of these are nearshore species.

Table 7.3.1. Virgin or peak observed biomass (mt) of species with stock assessments.

	Virgin or Maximum Observed Biomass		Virgin or Maximum Observed Biomass
Pacific whiting	7,272,000	Northern anchovy	1,598,000
Pacific sardine	4,015,000	Pacific mackerel	1,394,000
Jack mackerel	1,905,000		
Sablefish	723,000	Shortspine thornyhead	230,000
Dover sole	596,000	Longspine thornyhead	228,000
Shortbelly rockfish	295,000	Yellowtail rockfish	138,000
Widow rockfish	265,000		

	<u>Virgin or Maximum Observed Biomass</u>		<u>Virgin or Maximum Observed Biomass</u>
Canary rockfish	93,000	Darkblotched	28,000
Pacific Ocean Perch	83,000	Petrale sole	26,000
Lingcod	76,000	Vermilion rockfish (Calif.)	21,000
English sole	63,000	Blackgill rockfish (Calif.)	21,000
Chilipepper rockfish	58,000	Black rockfish	20,000
Bocaccio	46,000	Bank rockfish	14,000
Yelloweye rockfish	8,700	Cowcod (Southern Calif)	3,200
Starry flounder (Calif. only)	5,800	Cabezon	2,400
Gopher rockfish	2,400	Scorpionfish	2,000

It appears to have not been appreciated that the species that dominate the California Current Region are very unlikely to benefit from an MPA network designed along the guidelines suggested by the SAT. The species that would be expected to benefit are mostly nearshore, sedentary species that have quite small populations. This contrast does not appear to have been included in the “how much is enough and how much is too much” MPA discussions.

Further, the fact that the “communities” consist of species with widely varying movement patterns implies that it is impossible to reconstruct, or even sensibly define, completely “intact” communities without shutting down all fisheries, including some that are not even within US jurisdictions (like the Mexican sardine fishery, that may very likely impact future abundance of small pelagic species along the California coast). The prevalence of mobile species in the ecosystem biomass spectrum emphasizes the point that fisheries management plans, especially for the more mobile species, must be carefully coordinated with MPA planning, as noted above.

“Biodiversity” has become a catchword for protection of relatively rare, specialized, and charismatic species, particularly birds and mammals. If we were really interested in maximizing biological diversity, as ecologists typically define and measure it, we would likely want to promote “intermediate disturbance” regimes involving fisheries as an ongoing, even healthy agent of disturbance. There is certainly a legitimate case for protection of the species typically used as biodiversity indicators, without use of ambiguous terminology.

A wide variety of ecosystem models has been developed to evaluate impacts of fisheries on ecosystem function, particularly food web structure and productivity. While differing widely in details, these models generally agree on one key prediction about the predators (birds, mammals) that represent biodiversity interests: these species at the top of the food web should be the most sensitive indicators of loss of ecosystem function. That is, declines in natural productivity and food web components due to fishing should have the largest negative impact at the top of the food web. The existence of healthy, growing marine mammal populations along the California coast is certainly not indicative of gross loss of ecosystem function due to historical fisheries. Moreover, recent research has found that *Toxoplasma gondii* and other parasites, rather than fishing, is largely responsible for limiting the central coast sea otter population, although that population, too, is growing slowly.

Proponents of ecosystem restoration often assume that simultaneous protection of all species will somehow lead to harmonious increases in abundances of all of them. This assumption is dangerously wrong, particularly in cases where top predators (marine mammals, birds) are increasing while feeding on fish and invertebrates that are initially at low abundances due to historical fishing impacts. In such cases, the top predators can cause severe, depensatory mortality impacts on their prey, so as to prevent the prey populations from recovering. An obvious example in California is the impact of growing sea otter populations on recovery of abalone on the central coast (Fanshawe et al. 2003). There is correlative evidence that growing seal, sea lion, and bird populations along the Pacific coast are causing increasing mortality rates of juvenile salmon. Some believe that recovery of cod populations off eastern Canada is being prevented by large, growing seal populations.

In reviewing the major functional groups in the California coastal marine ecosystem ranked by biomass (Field, Francis and Aydin 2006) as a key indicator of functional significance (at least in trophic aspects of ecosystem structure), it is obvious that all of the big contributors are species that are either not fished (i.e. krill and midwater fishes), are relatively mobile and have complex seasonal migration patterns, or are mainly found in deeper waters, and so will be offered little, if any, real protection under any of the MPA proposals. Thus none of the MPA plans contributes very much to the ecosystem function of the region.

It is well known that the California Current System is impacted by environmental and climatic variation at a wide range of time and space scales, ranging from extreme storm events, variations in seasonality, El Niños and regime (decadal) scale processes (Parrish and Tegner 2001). These variations result in both species specific (El Niño and squid; regime changes and sardine) and trophic level (El Niño and regime changes in plankton) alterations in the abundance of dominant organisms. Sorting out the relative impact of ongoing climatic variations and recent changes in fishery management from the relatively smaller impact expected from the establishment of MPAs is going to be a very difficult science problem.

#### **7.4. Integration of marine reserves with fishery management measures**

Although the MLPA simply calls for “more than one” marine life reserve of eight key habitat types in each bioregion, the science advice incorporated in the MLPA master plan framework calls for a very extensive network of marine reserves, and all of the plans proposed consist of a substantial number of reserves and a significant proportion of the total area closed to fishing. However, it is quite clear that the impact of MPAs is minor relative to the fisheries management actions taken by the PFMC and State. For commercially important species, we find there would be absolutely no benefit to the sustainable harvesting of these species from any proposed MPA network.

For example in our simulations of bocaccio management, there would be essentially no impact of MPA’s until the stock is rebuilt, because the exploitation rate in the rebuilding period is so low. Further, once the bocaccio stock is rebuilt to 40% of virgin abundance, MPAs would have no benefit in larval production because of the very substantial larval production coming from outside the MPAs. The same conclusion is true for any species



being managed for commercial fishing: if the stock is overfished, the PFMC and State put it on a rebuilding schedule that involves very low fishing mortality rates.

There are a variety of reasons proposed for creating reserve networks, ranging from providing a backstop or hedge against ineffective fishery management, to providing reference areas for evaluating effects of fisheries with highly uncertain ecological impacts (e.g. for urchins and sea cucumbers), to protecting habitats and non-target species from gear and bycatch impacts. Generally, protection of large percentages (20-30%) of fishable areas has been recommended mainly for the first of those purposes, fishery management failure, or for situations involving severe bycatch impacts on non-target species.

All of the stakeholder packages have area in MPAs that exceeds the midpoints of the size and spacing guidelines recommended by the SAT. The mid-points for size (12.5 km) and spacing (75 km) result in a percentage of 14.3% of the area in MPAs if all MPAs extend out to 3 miles from shore. The California Nearshore Fishery Management Plan calls for at least 10% of nearshore area in MPAs and it suggests that 20% would be called for if fishery management were ineffective.

Although fishery management in California has resulted in a number of species being listed as overfished, changes in fisheries management policy for important species have been dramatic, and the regulations to reduce fisheries pressure, for example implementing extensive no-trawl MPAs to protect benthic habitat and demersal species and quotas to limit bycatch, are both draconian and effective. Further, our spatial modeling results indicate that protection levels of the range of Packages 1-3 would act as an effective hedge against failures of management policy **only for highly sedentary species**, as indicated in the left versus right panels of figure 4.4.1.

### 7.5. Spatial redistribution of fishing effort and consumptive impacts

Spatial site selection by commercial and recreational fishers is a complex process. When particular fishing opportunities are lost, fishing effort does not simply go away; fishers go elsewhere and may target different species if they have the flexibility to do so. This means that if total efforts are not reduced in proportion to the loss of fishing area into SMR, and if commercial effort shifts are not considered in relation to areas lost to SMCAs and SMPs, fishing effort and mortality rates caused by it will likely increase in remaining open areas. Such effort response dynamics can end up doing more harm than the benefits gained in protected areas, if fishers move into areas where species more needful of protection are concentrated. An example of this effect was reported by Walters and Bonfil (1999), where detailed spatial data from the British Columbia trawl fishery were used to map distributions of 16 demersal species, and impacts of shifting effort distributions over these fish distributions were predicted for a series of local closure options.

One option for long-term management of sensitive species, particularly deep-water rockfish, would be to permanently close large areas now protected as essential fish habitat (EFH closures) and rockfish conservation areas (RCAs). Our models indicate that if such closures were the only available management measures, it would be necessary to keep at least 70% of

the deep water area closed to fishing in order to limit fishing mortality rates to MSY target levels of less than 10%/yr. But if such large areas were closed to fishing, so that the majority of the fish stock was in protected areas, several negative consequences occur for the fishing fleets. The abundance outside the reserves is low, and as a consequence catch rates are low and fishing even less profitable than it is now. Any future in which the average density outside of the reserves is low would lead to declines in catch rates and probably economic failure of the commercial and recreational fisheries. For this reason, other methods for regulation of total catch and fishing mortality rate are essential to maintain economically viable fisheries, and stock abundance outside of reserves must be maintained or increased.

Negative effects of effort redistribution on target populations are highly nonlinear with exponentially increasing fishing mortality necessary to catch the same amount of fish as the percentage of the population within MPAs increases (Parrish, 1999). Negative effects would occur at lower MPA percentages if closures were placed in areas where effort is now particularly concentrated, such as in areas near headlands. In that event, there would be no safe alternative but to seek reductions in total fishing effort, through commercial license/quota reduction programs and/or imposition of direct limits on recreational fishing effort.

As mentioned above, the stakeholder process was influenced by a perception that nearshore hard bottom habitats 'merited' special protection. The three stakeholder packages do not have a wide range (i.e. roughly 15-19%) in the total percentage of area in MPAs (Table 7.5.1). However, all of the packages have 21-47% of all the classes of nearshore hard bottom habitats and 40-47% percent of the persistent kelp habitat in MPAs. Packages 2R and 3R have more than 30% of these habitats (37% to 47%) in MPAs. Clearly all of the packages developed by the stakeholders have a moderate to huge bias in the percentage of these habitats that were included in MPA.

Table 7.5.1. Percentage of near-shore hard bottom habitat types included in MPA Packages 1, 2R and 3R.

	Total MPA	Hard Bottom 0-30 m	Average Kelp	Persistent Kelp	Rocky Shore
Package 1	14.90	20.54	24.59	39.96	29.56
Package 2R	19.26	31.26	40.36	46.88	38.05
Package 3R	17.25	31.43	38.73	43.10	37.45

If such extensive MPAs are approved, this issue will need to be addressed by the fishery managers responsible for the Nearshore Fishery Management Plan, because the present precautionary quotas and regulations could not be expected to produce sustainable fisheries if 21-31% percent of the habitat (i.e. 0-30 m hard bottom) and 25-47% of the prime habitat (i.e. average kelp, persistent kelp and rocky shore) were placed in MPAs. The NFMP suggests 10% set aside in MPAs with precautionary fishery management.

**7.6. Failure to account for dispersal imbalance effects in assessing needed MPA sizes: need to confront the SLOSS tradeoff more carefully**

Computer simulation studies (e.g. Fig. 11.10 in Walters and Martell, 2004; see also Meester, et al. 2001 and Figures in this report) warn that impacts of heavy fishing pressure near MPA boundaries can have impacts on abundance that extend well into the MPA, beyond typical dispersal distances for the impacted species. Two mechanisms cause this effect: (1) individuals with home ranges near the boundaries are still subject to risk of harvest, and more importantly, (2) “dispersal imbalance” effects, which have not been widely recognized by proponents of MPAs. Dispersal imbalance effects occur when there is movement out of sites near the boundary, but this movement is not balanced by movements into the site due to lack of “source” animals to move into the site from sites toward and outside the MPA boundary. Models with density-dependent movement (more movement of individuals from high-density sites near the core of the MPA, (see e.g. Abesamis and Russ 2005) predict even larger imbalance effects on overall MPA abundance. Such effects are difficult to measure in patchy environments and may take years to develop after an MPA is created, but can considerably reduce the long-term abundance benefits of localized protection from fishing.

For MPAs located against shorelines, where dispersal movements are mainly alongshore, models of 10km alongshore MPAs indicate that dispersal imbalance effects will cause about half the reduction in overall population increase in the MPA as the annual dispersal rate out of each 1km reach within the MPA. That is, if 20% of the animals disperse from each 1km reach within the MPA to settle in adjacent 1 km reaches, overall long-term abundance across the 10 km will end up about 10% lower than would be predicted in the absence of movement. The predicted reduction is roughly halved for a 20km wide MPA.

Concerns about dispersal loss from MPAs, along with concerns about costs of enforcement to prevent illegal fishing near MPA boundaries, have been at the heart of the so-called “SLOSS debate” (Single Large or Several Small) about design of regional MPA networks. The MLPA SAT appears to favor the SS (Several Small) side of this debate, in calling for multiple (3-5) “replicates” of relatively small MPAs within each major regional habitat type.

**7.7. Inappropriate use of simple percentage guidelines in comparing plan alternatives**

We caution against the use of simple percentage standards for evaluation and screening of MPA plans, e.g. setting targets like protection of 20% of each habitat type. No sound ecological basis for particular percentages has been demonstrated using ecological models or historical data, nor is there a sound economic or social justification for them. The numbers typically mentioned, 20%-30%, appear to have been derived from stock assessment models that commonly predict recruitment overfishing when spawning abundance falls to less than about this level, but such estimates are typically highly unreliable due to scarcity of recruitment observations at lower stock sizes. Further, using the same percentages for protection targets as for minimum spawning abundance assumes that the only substantial spawning will be in the protected areas, i.e. all other spatial components of the spawning stock will be destroyed by fishing. Such catastrophic depletion is extremely rare, and mainly

involves migratory stocks that have exhibited severe range collapse (e.g. cod, herring) and for which small MPAs would be inappropriate in the first place.

Further, reasonable and acceptable levels of protection may vary widely among basic habitat types. For example, we doubt that there would be few people, excluding those who harvest clams, who would object to SMR protection of essentially 100% of the very unique estuarine habitats along this section of the California coast. But at the other extreme, it may be unnecessary to have SMR-level protection for more than a few percent of shallow, rocky inshore areas where exploitation is mainly by recreational fishing/diving and for which there is already protection for species being selectively depleted (abalone).

**7.8. Inappropriate goals for rebuilding stocks of long-lived species**

There seems to be an assumption by the Scientific Advisory Team that long-lived species need to have higher spawning stocks relative to unfished levels, i.e. targets for stock rebuilding for species like rockfish need to be on order 50% of unfished levels. However, meta-analyses like the paper by Goodwin et al (2006) indicate just the opposite, with longer-lived fishes showing much steeper stock-recruit relationships (higher Goodyear compensation ratios), i.e. lower spawning numbers needed to insure adequate recruitment. If this is true, historical recruitment overfishing may not have been all that severe for many species, and rebuilding of age structure in such species will lead to increased larval settlement, but not increased recruitment out of nursery areas. Failure to anticipate this strong possibility could lead to systematic misinterpretation of the results of monitoring programs.

**7.9. Naïve assumptions about importance of connectivity among reserves in setting standards for reserve number and spacing**

For species that have been severely reduced by historical fishing, particularly those that have life history ontogeny involving inshore nursery areas and later movement into deeper waters, there is the possibility that nursery areas are now widely “underseeded” with larvae, i.e. are not producing nearly as many offshore recruits as they could. If this is the case, then even onshore-offshore protection (MPAs that extend well offshore) will not insure rapid population recovery, since abundance even in the MPAs may be limited by inadequate recruitment rather than depressed survival. For such species, the main “connectivity” among MPAs will be due mainly to relatively large-scale larval dispersal rather than alongshore movement of older fishes. But if even larval settlement into MPAs is depressed due to large-scale historical overfishing, then recovery in MPAs will be slow enough that (unless a very high proportion of the offshore population is protected) most larval settlement will have to come from spawning outside the MPAs. That is, it may be wrong to suppose that MPA spawning abundances will recover rapidly so as to provide widespread larval seeding including connection through larval transport with other MPAs.

In short, considering ontogenetic patterns of movement in fishes, except for species with very short dispersal distances (like abalone), the main connections between MPAs will be due to larval dispersal, and it is only if there are no fish left outside of the reserves that such connections are significant.

**7.10. Coordination of state and federal MPA development to insure onshore-offshore continuity of protection and effective monitoring programs**

The design of effective onshore-offshore protected areas to cover the full life cycle of the many species with ontogenetic habitat shifts will obviously require close State-Federal cooperation. So far that does not seem to be a major problem in California, with if anything even stronger fishery restrictions being imposed offshore (rockfish closed areas, groundfish EFH) than inside the three-mile State jurisdiction. It is probably a safe assumption that Federal management programs will continue to be strongly conservation oriented with emphasis on rebuilding depleted stocks to productive levels as mandated under the Magnuson-Stevens Act.

But it is not just in relation to coordination of closed area designations that close State-Federal cooperation will be required. Much of the key monitoring data, especially for deepwater fishes and habitats impacted by activities like trawling, will have to come from ongoing Federal science programs. There will likely continue to be dramatic changes in Federal policies for fishery access, toward limited entry and quota management programs aimed at creating property right incentives for fishers to cooperate in sustainable management, which could strongly enhance (or prevent if not implemented) opportunities to develop collaborative fisher-scientist research programs.

## **8. Recommendations**

We offer the following recommendations to the Department of Fish and Game and Commission, based on our findings and adaptive management experience, both to improve this decision-making process and those to follow in the future.

*Recommendations (General)*

1. Implement a phased MPA network designed with a variety of MPA sizes and with an adequate long-term monitoring plan and sufficient resources to test MPA theories.
2. Recognize that there is little chance that MPAs will contribute significantly to maintenance of marine ecosystem function; the function of these ecosystems is largely determined by highly mobile species that will be totally unaffected by MPAs. Only widespread, effective fisheries management will insure maintenance and restoration of ecosystem function.
3. Enforceability (proximity to populated areas, more eyes and ears) should be the number one criterion for specifying locations of SMRs and SMPs, until it is clear whether increases in enforcement staff combined with use of new monitoring technologies will make this criterion unnecessary.
4. Closely examine existing bycatch data and apparent fishing mortality rates suffered by non-target species to quantify the extent and severity of the problem, including identification of spatial areas where bycatch problems are most severe as possible candidate areas for SMR designation.
5. Work with State and Federal management agencies to develop by-catch reduction plans as part of the overall MLPA planning and implementation process.
6. There is a critical need to develop spatial maps of fishing efforts and impacts for the major California fisheries, using commercial logbook and creel census information along with assistance from knowledgeable fishers (using workshop data synthesis and mapping processes) where quantitative distribution data are not available.
7. Using such maps, fishing effort displacement should be calculated for each MPA plan proposed, and estimates made of the increase in fishing effort and impact in remaining areas open to fishing.
8. Long-range proposals and plans should be developed for reduction in overall fishing efforts for those fisheries where substantial (20 % or larger) displacement is likely to occur.
9. Avoid using concepts from terrestrial protected area planning in MPA design, and instead use appropriate models

*Recommendations (to improve scientific guidance and analysis)*

10. The Scientific Advisory Team, in collaboration with experts on enforcement, should look more carefully at guidelines for MPA number and size, and in particular should consider recommending fewer (2 is the minimum needed for statistical comparisons, not 3) but larger protected areas per key habitat type for more efficient and economical implementation and enforcement.
11. We recommend that the Scientific Advisory Team be required to provide specific guidelines for desired levels of protection by habitat type, with precise justification for each of these guidelines and with quantitative predictions (using population dynamics models for a range of representative species) of the consequences of failing to meet them.
12. We recommend that the Scientific Advisory Team develop quantitative classification guidelines to be used to evaluate the levels of protection assigned to MPAs.
13. The Scientific Advisory Team should develop a list of species to be benefited by MPAs that provides a quantitative assessment of the degree of benefit that each species is expected to receive.

*Recommendations (Modeling)*

14. Consider investing in a California coast-scale hydrodynamic modeling and larval drifter/vertical movement model that can realistically examine alternative hypotheses about likely connection patterns among spawning and larval settlement areas for a variety of indicator species (Note: this is a risky approach and could fail completely due to inadequate knowledge about spawn timings and vertical movement patterns of larvae).
15. Use the models we have provided as a starting point for more careful quantitative analysis and comparison of alternative MPA proposals.
16. Involve stakeholders in game-playing with the models, and in trouble-shooting possible missing model components and functional relationships needed for prediction, as a central part of the adaptive management planning process and as a means to stimulate development of cooperative monitoring programs.
17. Use the models as an aid to development of monitoring designs, both in terms of helping to identify key monitoring variables (i.e. what model predictions do people really look at in comparing policy alternatives) and in design of spatial sampling programs and inside-outside comparisons of open areas versus MPAs.

*Recommendations (Monitoring)*

18. Adopt the institutional design framework recommended in the “Final Draft Adaptive Management and Monitoring and Evaluation Framework”, but modify it immediately to address the hard-nosed issues of exactly what to monitor, where, and when, and

how. Focus on the recommendations in Appendix 3B of that report and incorporate the monitoring recommendations provided in this review. Discard the recommendation in that draft of designing monitoring programs around broad biogeographical regions; there is no need to do that for effective adaptive management based on paired comparison data between nearby protected and fished areas.

19. A joint State-Federal task group should be formed to develop a detailed, cooperative monitoring program with costs and cost sharing proposals, taking full account of possible cooperative monitoring efforts that will become feasible given planned changes in fishing property rights and recent support for collaboration between industry and fishery management agencies.
20. Begin monitoring basic ecological response indicators (relative abundances, sizes of representative species, i.e. essential fishery information) ideally at least two years before implementation of each new MPA.
21. Plan to continue these paired monitoring programs for at least a decade after establishment of each MPA, so as to assess cumulative effects of both the MPA and other management influences and to allow staircase comparisons to MPAs initiated later in time.
22. There should be a careful enumeration of the total number and kind of field measurements that will need to be taken annually for the foreseeable future as the core of the core adaptive management monitoring program, with particular attention to the need for paired measurements in and near each protected area.
23. A consensus statement should be developed on a basic, key indicator set that must be measured on all experimental (and reference) areas.
24. There should be increased funding for and very careful evaluation and encouragement of the cooperative programs between fishers and scientists that are now underway in some locations (e.g. tagging in Channel Islands area), with a view to extending such programs much more widely along the coast.
25. Carry out the same monitoring (same methods, etc.) on at least one “control” or reference area in close proximity to each protected area (treatment-control pairing).
26. Monitoring programs should attempt to measure both settlement rates of very small juveniles, especially rockfishes, and also net production (recruitment) of larger juveniles out of nursery areas.
27. Monitoring programs for longer-lived species should regularly collect size-age distribution samples to assess rebuilding of population age structures, and the component of overall abundance increase due to this rebuilding as opposed to increases in recruitment rates.

28. Monitoring plans for adaptive management should include transect sampling of abundance for a set of indicator species with different movement rates, along transects from well outside MPA boundaries into the middle of the areas.
29. A study team should be formed to evaluate options for large-scale investment in new, automated technologies for ecological monitoring, in particular the deployment of large-scale listening arrays for acoustic tags that would provide an opportunity to measure movement and exploitation patterns directly for a variety of larger species.

## 9. Conclusions Regarding Goals of the MLPA

Based on the work we have done and our reading of the documents, we can make specific conclusions regarding the impact of the alternative proposals on the goals of the MLPA. First, however, it is important to acknowledge the significant contributions of environmental and climatic variation, as well as the impacts of coastal development, pollution and other non-fishing human activities, on the diversity and abundance of marine life and the structure, function and integrity of marine ecosystems. Such effects were not considered in the science advice or analysis of MPA proposals, although these climatic effects and non-fishing impacts play a significant role in achieving (or not achieving) Goals 1, 2 and 4.

### 9.1. **Goal 1: To protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems.**

Our primary finding with respect to this goal is that the high mobility of most key species in the central California marine ecosystem precludes any of the MPA designs from having a significant impact on the structure, function and integrity of the marine ecosystems. The primary determinants of the structure and functioning of the marine ecosystem will be the management of catches of the mobile species through the State and Federal harvest regulations. Only for the species with highly sedentary adults will the abundance inside of the MPAs be dramatically higher than outside of the MPAs; **however, outside of the MPAs their abundance will be less than the case with no MPAs.** The solitary, rocky bottom nearshore species managed under the California Nearshore Fishery Management Plan are good examples of species with this type of behavior (for example: gopher, black and yellow, china, and kelp rockfishes and cabezon). This group is also the most readily monitored with non-extractive methods.

### 9.2. **Goal 2: To help sustain, conserve, and protect marine life populations, including those of economic value, and rebuild those that are depleted.**

Because of the mobility of most species, especially those of commercial importance, none of the proposed patterns of MPAs will have a significant role in protecting species of economic value or in rebuilding those that are depleted. The main positive impact will be on the abundance and diversity of sedentary, demersal species that are now impacted by various

coastal fishing and poaching activities, as well as by coastal development and non-point source pollution.

### 9.3. **Goal 3: To improve recreational, educational, and study opportunities provided by marine ecosystems that are subject to minimal human disturbance, and to manage these uses in a manner consistent with protecting biodiversity.**

Each of the alternative MPA plans provides for a large number of areas across a range of habitats that meet the objectives above. There is no scientific data in any of the material we reviewed to suggest criteria for how these objectives will be affected by the absolute number or size of protected areas.

### 9.4. **Goal 4: To protect marine natural heritage, including protection of representative and unique marine life habitats in California waters for their intrinsic value.**

Again all plans considered appear to meet this objective.

### 9.5. **Goal 5: To ensure that California's MPAs have clearly defined objectives, effective management measures, and adequate enforcement, and are based on sound scientific guidelines.**

We found that all plans presented have a number of failings with respect to this objective. Implicit in the science advice is the objective of building large protected populations inside of reserves, with reserves “linked” by larval dispersal. As we have discussed throughout our report, there does not appear to be any basis for this – for few species will abundance be much higher inside of reserves than outside, especially compared to protected areas that are not MPAs. Thus we don’t find the MLPA planning process to have realistic expectations regarding what can be achieved. We found almost no realistic evaluation of the management measures and enforcement.

### 9.6. **Goal 6: To ensure that the state's MPAs are designed and managed, to the extent possible, as a network.**

In the science advice we reviewed, the primary interpretation of the “network” concept was the linking of protected areas by larval dispersal. We found no evidence that this is a realistic expectation; our analyses suggest that most larvae arriving in MPAs will come from outside of MPAs. The primary networking of MPAs will be administrative, in their role as educational and recreational showcases.

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## APPENDICES

### Appendix A: A simple model for examining impact of MPAs on distributions and abundances of aquatic organisms with different dispersal and recruitment biology

At some point in the development of an MPA plan, it is necessary to make quantitative prescriptions about how large individual MPAs need to be and how they should be arranged in space. When MPAs are to be placed along a coastline like California's, where each MPA is intended to protect an inshore-offshore band that includes both juvenile nursery and older fish residence areas, the most important long-shore population impacts of protection can be quantified by using a simple, one dimensional spatial model with a large number of long-shore spatial cells or local sites that are linked through dispersal of both larvae and older animals, and that includes reasonable assumptions about two critical issues: (1) the local (per cell or site) relationship between local larval settlement and subsequent recruitment, and (2) impact of increased fishing effort in open areas when effort is displaced from MPAs.

We used the model described in this appendix to do a large number of simulations of long-term changes in distribution along the Central Coast shore line for five management scenarios (no fishing, no MPA protection, proposals 1, 2R, and 3R) for five species (see Fig. 1) for two alternative assumptions about the success of current coastwide management measures at reducing fishing mortality rates. The resulting 50 scenarios were also repeated with and without spatial fishing effort responses, and with and without spatial variation in habitat quality.

Suppose we divide a coastline up into  $i=1 \dots n$  spatial cells, each extending a longshore distance of say 1 mi. and extending offshore for an unspecified distance large enough to protect all life stages of a species. Suppose initially that all of these cells are equally suitable for the species in terms of habitat conditions. If  $N_i$  is the number of older individuals in cell (summed over all ages from an arbitrary age of recruitment or maturity), the dynamics of  $N_i$  can be approximated by the continuous recruitment-movement-mortality rate relationship

$$dN_i/dt = r(L_i) - MN_i - F_i N_i - 2mN_i + m(N_{i-1} + N_{i+1}) \quad (A1)$$

where the rate components are:

$r(L_i)$  is local recruitment rate as a function of local larval settlement rate  $L_i$

$MN_i$  is natural mortality rate

$FN_i$  is fishing and/or bycatch mortality rate

$2mN_i$  is movement rate of older animals out of cell  $i$  to the two adjacent cells

$mN_{i-1}$ ,  $mN_{i+1}$  are movement rates of animals in to cell  $i$  from surrounding cells.

For evaluation of the long-term impacts of protection, we need not solve eq. (1) over time, and can instead try to find the long term mean or equilibrium  $N_i$  implied by  $dN_i/dt=0$ . This equilibrium abundance field must satisfy the relationship

$$N_i = [r(L_i) + m(N_{i-1} + N_{i+1})] / [M + F + 2m] \quad (\text{A.2})$$

(this is obtained just by setting  $dN/dt$  to zero and solving eq. (1) for  $N$ ). Due to the nonlinear dependence of  $L_i$  and  $r(L_i)$  on larval transport and survival patterns, eq. (2) cannot be solved analytically for the long term  $N_i$ ; however, it can be easily solved by numerical “relaxation” methods, which basically just involve substituting successive estimates of the  $L_i$  and  $N_{i-1}$ ,  $N_{i+1}$  into the right-hand side of (2) and using the resulting estimates of  $N_i$  as the inputs for the next iterative substitution.

The really critical term in eq. (1)-(2) is the recruitment function  $r(L_i)$ , which involves issues of both how far larvae are dispersed (how  $L_i$  is formed as a sum of larval contributions from other cells), and whether there is strong density-dependence in post-settlement survival rates (whether or not juvenile nursery habitats are “fully seeded” so that recruitment is independent of larval settlement). Absent strong long-shore advection of larvae in particular direction(s), we would expect dispersive mixing processes to result in a normally distributed pattern of larval settlement from spawning in each cell, with a spread or standard deviation parameter proportional to larval duration and mixing velocities per unit time. The normal distribution assumption for larval settlement implies that if there are no larval sources outside the study region, average larval settlement  $L_i$  on each cell  $i$  should consist of a sum of larval contributions from potentially all other cells, with the functional form

$$L_i = k \sum_{j=1}^n N_j e^{-0.5(j-i)^2/S^2} \quad (\text{A.3})$$

Here,  $k$  is a scaling constant for total larval settlement from each source cell, and  $S$  is the standard deviation of the spatial distribution of larval settlement (e.g.,  $S=10$  implies that settlement of larvae produced in a cell drops off rapidly beyond 10 mi. from that cell). Note that summing over all cells  $j$  implies that larval settlement on cell  $i$  may include contributions from any or all of the other cells  $j$ .

Using eq. (3) to predict average larval settlement to each cell  $i$ , the key issue then becomes prediction of how recruitment rate  $r(L_i)$  varies with  $L_i$ . Absent evidence of recruitment suppression at high  $N_i$  due to cannibalism or spacing behaviors by the animals already present in cell  $i$ , we would expect the recruitment function to be of a saturating or Beverton-Holt form, i.e.

$$r(L_i) = \alpha L_i / (1 + \beta L_i) \quad (\text{A.4})$$

where  $\alpha$  is the maximum survival rate of larvae from settlement to recruitment, and  $\alpha/\beta$  is the maximum recruitment rate (carrying capacity of the cell to produce recruits). Suppose we hypothesize a base or reference natural natural settlement rate  $L_o$  for each cell, calculated by setting  $k=1$ ,  $i=n/2$  and all  $N_j$  in eq. (3) to a base unfished abundance  $N_j=R_o/M$  where  $R_o$  is an average natural recruitment rate per cell. Then we can parameterize the recruitment relationship in terms of  $R_o$ ,  $L_o$ , and the “Goodyear compensation ratio”  $K$ , by setting

$$\alpha = KR_o/L_o$$

$$\beta = (K-1)/L_o \quad (\text{A.5})$$

Note that in this parameterization of the Beverton-Holt function, absolute larval production per spawner ( $k$ ) does not matter, since only the product of it times maximum larval survival rate (that product is  $\alpha$ ) actually appears in the recruitment prediction. Metaanalyses of stock-recruitment data indicate that we should expect the compensation ratio  $K$  (ratio of maximum larval survival at low densities to survival at unfished natural abundance) to be in the range  $K=5$  to  $K=100$ , with most likely values for long-lived benthic species in the range  $K=10-50$ . The critical parameter in this representation is  $K$ , which determines how much larval settlement can be reduced before net recruitment  $r(L)$  is impaired;  $R_o$  is simply a scaling parameter that is determined by (or implies, or represents) the units of measurement of  $N_i$ .

Note that in assuming that local recruitment is a function only of local larval settlement (Eq. A4), we join other modelers (e.g. Gaylord et al. 2005, Botsford et al. 2004; Kaplan and Botsford, 2005; see also review by Gerber et al. 2003) in ignoring post-settlement longshore movement by juveniles prior to recruitment to the older population  $N$ . This is not a serious issue for species where juvenile nursery habitat is widely distributed along the coast, since for such species juvenile movement just acts like wider spreading of larvae in the first place (we could account for it by increasing the  $S$  parameter in eq. A3). But for species that depend on very restrictive nursery habitats (e.g. estuaries) from which juveniles fan out to occupy other habitats as part of their ontogeny, we really should include calculations of pre-recruit juvenile movement using the same approach as eq. A3 but applied to the survivors from density-dependent mortality effects in the restricted nursery areas. The age-structured model in Appendix B allows for fully age-dependent movement rates.

The above formulation allows for variation among species in the following basic life history parameters:

- M-natural longevity (annual natural mortality rate)
- m-adult diffusive movement rate between cells (per year)
- F-base (and policy) fishing mortality rate (per year)
- S-larval dispersal distance (standard deviation of normal settlement curve, mi.)
- K-compensatory improvement in juvenile survival at low stock sizes.

Equations (2)-(5) can be easily solved for equilibrium  $N_i$  patterns given these life history (and exploitation) parameters, in a spreadsheet format that calculates successive estimates from previous trial estimates: use last trial estimates of all  $N_i$  to calculate  $L_i$  using eq. (3), then calculate  $r(L_i)$  using eq. (4), then substitute this estimate of  $r(L_i)$  into equation (2) to obtain updated estimates of the  $N_i$ ; repeat these steps until the  $N_i$  stop changing. Note that this iteration produces numerical “chatter” in the predicted spatial distribution for high  $m$  values ( $>5/\text{yr}$ ); this can be corrected by setting the  $N_i$  for each iteration to  $w$  times the updated estimate from the equations, plus  $(1-w)$  times the estimate from the previous iteration, where the “relaxation weight”  $w$  is less than 1.0 (values like 0.8 usually work well, but result slower convergence of the estimates).



The only major population dynamics factors that are not represented in the above equation system are (1) changes in mean larval production per adult with changes in age-size composition, i.e. increases in mean fecundity per  $N_i$  in spatial cells that have lower total mortality rates  $M+F_i$ ; and (2) spatial variations in juvenile and adult habitat capacity, as might be reflected in spatial variation in the juvenile carrying capacity parameter  $\beta$  and in adult dispersal rate  $m$  (higher dispersal rates out of areas with relatively poor habitat). It is not difficult to model spatial variation in mean fecundity with variation in  $M+F_i$  for species that are not highly dispersive (low movement rates  $m$ ), and omitting this variation results in somewhat conservative predictions about the benefits to larval production of reducing local mortality rates (when dispersal rates are high, mean fecundity cannot increase in protected areas since loss of older animals into fished areas prevents the development of a “natural” age structure; only relatively small, e.g. 5%, annual emigration rates are enough to substantially lower mean fecundity for long-lived species). We have tested variable fecundity versions of the model for the species shown in Fig. 1, assuming fecundity proportional to the ratio of numbers per recruit to unfished numbers per recruit (mean fecundity declines with decreasing survival rate in rough proportion to this ratio), and found no substantial change in the basic predictions. It is likewise simple to model variation in nursery capacities ( $\beta$ ) among cells, and movement rates  $m$ .

When using the model to evaluate MPA proposals that involve closing a large proportion of the cells to fishing (by setting  $F_i$  for those cells to zero or to some lower predicted poaching rate), a key consideration is what to assume about fishing effort displaced from the cells after closure. One simple option is to assume historical  $F_i$ , which amounts to assuming that total fishing effort will be reduced so that the  $F_i$  in each remaining cell does not increase. A more realistic option is to assume that displaced effort is spread across the remaining open cells, so that  $F_i$  for each cell changes from a base value  $F_o$  to a higher value

$$F_i = F_o / (1 - c) \quad (A.6)$$

where  $c$  is the proportion of the cells closed to fishing under the proposal. A still more realistic option would be to use a gravity or multinomial logit model to predict spatial redistribution of fishing effort, so as to recognize likely concentration of fishing effort near MPA boundaries where abundances are enhanced by “spillover” effects of movement rates  $m$ .

For simple policy screening exercises involving general comparisons of how well alternative MPA proposals are likely to perform at enhancing abundances of animals with a range of different life histories ( $M$ ,  $m$ ,  $S$ ,  $F$ ,  $K$  values), it is probably best not to complicate the comparisons by including variations in spatial habitat and effects of increased longevity/fecundity. In simple game-playing exercises where we have varied the life history parameters widely, we have found that predictions are typically not particularly sensitive to the longevity ( $M$ ), adult movement ( $m$ ), and larval spreading ( $S$ ) parameters except in evaluations of very small MPAs (<3 mi wide). Instead, the most critical parameters for predicted performance are the historical fishing rate and recruitment compensation parameters  $F$  and  $K$ . These are exactly the same parameters that are most critical in comparisons of fisheries harvesting policies in general, using standard stock assessment models.

Two extensions of the basic model can be used to generate considerably more realistic scenarios for particular species. First, spatial variation in fishing effort can be predicted with a multinomial logit (gravity model) based on the assumption that average “utility” of each area to fishers is proportional to the logarithm of abundance in that area. This leads to the spatial effort or fishing mortality allocation model

$$F_i = F_{\text{total}} N_i^{1/v} C_i / \sum_j N_j^{1/v} C_j \quad (A.7)$$

Here  $v$  is a “standard deviation” among fishers in perception of the utility of fishing in cell  $i$  compared to other areas (higher  $v$  spreads effort more evenly along the coast),  $F_{\text{total}}$  is the total number of spatial cells times the base assumed fishing rate  $F_o$  per cell, and  $C_i$  is set to 1.0 for cells that are open to fishing and to 0 for closed cells. Second, spatial variations in habitat “quality” or carrying capacity among cells can be represented by variation in dispersal rates and recruitment carrying capacities. For each cell, assume that relative habitat quality can be represented by a 0-1 index value  $h_i$ , where  $h_i=1$  represents the best quality habitat and  $h_i=0$  represents completely unsuitable habitat. A simple way to estimate the  $h_i$  is to examine distributions of fishing effort, since effort is likely to be concentrated in cells with higher habitat quality and fish abundance. Then we simply multiply the recruitment  $\alpha$  for each cell by  $h_i$  in predicting recruitment, and further assume that emigration rates ( $m$ ’s out of the cell) increase to  $m/h_i$  for cells with low  $h_i$  while immigration rates ( $m$ ’s into the cell) decrease to  $h_i m$  for cells with low  $h_i$ .

An improved numerical procedure is necessary to solve for the equilibrium  $N_i$  for the “full” model with spatially varying effort and habitat quality, since for such cases the simple iterative procedure described above is likely to either converge very slowly (hundreds of iterations required) or to “chatter” so as not to converge at all. The following procedure converges very rapidly (10-20 iterations) for most parameter combinations. First, set the  $N_i$  to initial, trial values  $N_i^{(1)}$ , e.g.  $N_i^{(1)} = R_o / (M + F_o + 2m)$ . Then (2) use these estimates to solve eq. (3)-(6) for larval production, recruitment rates, and spatial  $F_i$  (setting  $F_i$  for closed areas to zero). Next, (3) treating the resulting recruitment and  $F$  estimates as fixed constants, solve a tridiagonal equation system for equilibrium  $N_i$ , where each equation in the system is given by  $r(L_i) = M N_i + F_i N_i + 2m N_i - m(N_{i-1} + N_{i+1})$ . This results in a vector  $N_i^{(\text{eq})}$  of new  $N$  estimates. Then (4) combine these with the previous estimates using a relaxation weight  $W$  of around 0.9, to give a next iterative estimate  $N_i^{(2)} = W N_i^{(\text{eq})} + (1 - W) N_i^{(1)}$ . Then use these estimates in step (2) to begin another iteration, repeating steps (2)-(4) until the  $N_i$  estimates stop changing.

## Appendix B. A fully age structured model for evaluation of MPA proposals

This model is a simulation of a completely age structured stock using a spatially structured coastline identical to that used in the model described in Appendix A.

We use the normal age structured model calculating the dynamics before movement

$$\begin{aligned}
 N'_{i,a+1,t+1} &= N_{i,a,t}(1 - u_{i,t}v_a)s_a \quad \text{for } a > 1, a < n \\
 N'_{i,n,t+1} &= (N_{i,n,t} + N_{i,n-1,t})(1 - u_{i,t}v_n)s_n \quad \text{for } a = n \\
 (B.1) \quad E'_{i,t} &= \sum_a N_{i,a,t}f_a \\
 V_{i,t} &= \sum_a v_a N_{i,a,t}w_a \\
 C_{i,t} &= \sum_a u_{i,t}v_a N_{i,a,t}w_a
 \end{aligned}$$

Initial conditions are calculated at equilibrium with an initial exploitation rate assumed the same at all areas

$$\begin{aligned}
 (B.2) \quad N_{i,1} &= R_\infty \\
 N_{i,a+1} &= N_{i,a}(1 - u_\infty v_a)s_a \quad \text{for } a > 1, a < n \\
 N_{i,n} &= N_{i,n-1} \frac{(1 - u_\infty v_n)s_n}{[1 - (1 - u_\infty v_n)s_n]} \quad \text{for } a = n \\
 (B.3) \quad R_{i,t} &= \frac{E_{i,t}}{a + bE_{i,t}} \\
 (B.4) \quad S_\infty &= \frac{SBPR - a}{b \times SBPR}
 \end{aligned}$$

$N'_{i,a,t}$	number of individuals area i, age a time t before movement
$N_{i,a,t}$	number of individuals area i, age a time t after movement
$u_{i,t}$	fraction harvested area i time t
$u_\infty$	fraction harvested at initial equilibrium
$v_a$	vulnerability to fishing age a
$n$	oldest age considered
$s_a$	survival from natural mortality
$E'_{i,t}$	eggs produced area i time t before movement
$E_{i,t}$	eggs produced area i time t after movement
$f_a$	egg production age a
$g$	recruitment function (B/H, Ricker etc)
$C_{i,t}$	biomass of catch
$V_{i,t}$	vulnerable biomass
$w_a$	mass at age a
$R_\infty$	recruitment at equilibrium

the fish are then moved according to a movement probability matrix

$$\begin{aligned}
 (B.5) \quad N_{i,a,t+1} &= \sum_{j=1}^n N'_{j,a,t+1} P_{j,i} \\
 (B.6) \quad E_{i,t+1} &= \sum_{j=1}^n E'_{j,t+1} P_{j,i}^{egg}
 \end{aligned}$$

The movement matrix is calculated by assuming that the movement probability has a normal shape centered on the area of origin, the same functional form is used for both the eggs and individuals age 1 and older, they just have a different value of m.

$$(B.7) \quad p'_{j,i} = \exp\left(-\frac{(i-j)^2}{2m^2}\right)$$

which is normalized to sum to one for each donor area.

This same relationship is used for egg and larval dispersal.

$$(B.8) \quad p_{j,i} = \frac{p'_{j,i}}{\sum_i p'_{j,i}}$$

The number of boats in an area is calculated as follows

$$(B.9) \quad \begin{cases} B_i' = \exp \left[ -c \left( 1 - \frac{V_i}{V} \right) \right] & \text{if area } i \text{ is not in a reserve} \\ B_i' = 0 & \text{if area } i \text{ is in a reserve} \end{cases}$$

$$B_i = B \frac{B_i'}{\sum_i B_i'}$$

These equations cause boats to concentrate in places of highest fish abundance. The larger the value of  $c$ , the stronger the concentration.

The fraction harvested in each area is determined by the number of boats, the efficiency of boats ( $q$ ) and a scaling factor when regulations reduce the allowable catch ( $z$ ).

$$(B.10) \quad u_{i,t} = B_{i,t} q z$$

$$(B.11) \quad TAC_t = \left[ s \sum_i V_{i,t} \right]$$

where  $I$  is the intercept and  $s$  is the target harvest rate for the stock summed over all areas inside and outside the MPA.

If the catch that would occur without regulation is less than the TAC then the regulations have no effect. If the catch that would occur without regulation is greater than the TAC then the catch in each area is reduced proportionally so that the total catch is equal to the TAC by adjusting the scaling factor  $z$ .

$$(B.12) \quad z = \frac{TAC_t}{\sum_i q B_{it} V_{it}}$$

In general there are three harvest rates specified, the initial equilibrium harvest rate used to set the population at its initial age structure and abundance, the “rebuilding” harvest rate to be used if the stock is below 40% of its virgin biomass, and finally a sustainable management harvest rate to be used if the stock has rebuilt to above 40% and is now in sustained management. Even if the sustainable management harvest rate drops the stock below 40% of virgin biomass, we do not change the harvest rate.

## Appendix C. Documents reviewed in preparing this report

Besides scientific papers cited above and information on specific network proposals that we obtained from the MLPA website (<http://www.dfg.ca.gov/mrd/mlpa/centralcoast.html#maps>), we used the following documents in preparing this report:

1. California Marine Life Protection Act Initiative Master Plan Framework adopted by California Fish and Game Commission August 22, 2005.
2. Appendices to the Master Plan Framework, California Marine Life Protection Act Initiative Master Plan Framework adopted by California Fish and Game Commission August 22, 2005.
3. NFCC Consensus Statement, Integrating Reserve Science and Fishery Management, June 2004.
4. California MLPA Initiative, Central Coast Project, Adopted Regional Goals and Objectives Package Amended by the Blue Ribbon Task Force, Design and Implementation Considerations, November 2005.
5. California Marine Life Protection Act Suggested Text Revisions to Pages 37-47 of the MLPA Master Plan Framework for Consideration by the Master Plan Science Advisory Team February, 2006.
6. DRAFT Document Rationale for SAT categorization of MPAs by relative levels of protection by Mark Carr, Rick Starr, and Mary Yoklavich. January 2006.
7. California Marine Life Protection Act Initiative draft SAT Summary of Goals 1, 2, 3, 4, and 6. March 2006.
8. California MLPA Initiative Final Draft Adaptive Management and Monitoring and Evaluation Framework. March 2006.
9. Integrating MPA monitoring into Sustainable Fisheries Management. Outline of Presentation to Fish and Game Commission, Dec. 2005 by Donna Schroeder, Chris Hoeflinger, and Chris Miller.

## Appendix D. Curricula Vitae for Peer Reviewers

**NAME** RAY WILLIAM HILBORN

### EDUCATION

B.A. (Biology) Grinnell College, Grinnell, Iowa (1969)  
Ph.D. Department of Zoology, University of British Columbia (1974)

### EMPLOYMENT HISTORY

2001-present Richard C. and Lois M. Worthington Professor of Fisheries Management  
1987-present Professor, School of Aquatic and Fishery Sciences, University of Washington.  
1996-1998 Director, Fisheries Research Institute, University of Washington  
1985-1987 Senior Fisheries Scientist, Tuna and Billfish Program, South Pacific Commission, Noumea, New Caledonia  
1980-1985 Adjunct Associate Professor, Institute of Animal Resource Ecology, University of British Columbia.  
1975-1980 Policy Analyst, Departments of Environment and Fisheries, Government of Canada. Concurrently Honorary Lecturer, Institute of Animal Resource Ecology, University of British Columbia.  
1974-1975 Research Scholar. International Institute for Applied Systems Analysis, Laxenburg, Austria.

### MAJOR PROFESSIONAL ACTIVITIES

2002 – present Member Editorial Board, Canadian Journal of Fisheries and Aquatic Sciences  
2003 - present Member Editorial Board, New Zealand Journal of Marine and Freshwater Research  
1999-present Member Editorial Board, Fish and Fisheries.  
1993-present Member Editorial Board, Reviews in Fish Biology and Fisheries  
1993-present Member Editorial Board, Natural Resource Modeling.  
1999-present Independent Science Advisor, Commission for Conservation of Southern Bluefin Tuna  
2002 – 2003 Chair, National Academy of Sciences/National Research Council Committee on Cooperative Research in the National Marine Fisheries Service  
2002 - 2004 Member Scientific Advisory Board for Presidents Commission on Ocean Policy  
1999-2001 Member Ocean Studies Board, National Research Council  
1996-2000 Member International Committee for recovery of the vaquita (*Phocoena sinus*)  
1997-1998 Member National Academy of Sciences Panel on status of New England groundfish stocks.  
1997-1999 Member NMFS panel to review fisheries closures to protect Steller's Sea Lions  
1996-1997 Member National Academy of Sciences Panel on Fisheries Stock Assessment Methods  
1989-1994 American co-chairman: Pacific Salmon Commission working group on mark-recovery statistics.  
1988-1990 Editor for Fisheries, Marine Policy Reports.

### HONORS AND AWARDS

2005 Elected Fellow of Royal Society of Canada  
2005 Recipient of American Fisheries Society 2005 National Award of Excellence  
2005 Recipient of Western Division, American Fisheries Society, Award of Excellence  
2001-2006 Richard C. and Lois M. Worthington Professor of Fisheries Management  
1997 College of Ocean and Fisheries Sciences Distinguished Research Award

1988-1991 H. Mason Keeler Professor of Recreational Fisheries Management.  
1985 Stevenson Memorial Lecture, Canadian Conference for Fisheries Research.  
1976 Wildlife Society award for best paper in fisheries science. (Adaptive management of renewable resources with C. Walters).  
1972-1974 National Research Council Canada. Graduate Fellowship.

### BOOKS AND MONOGRAPHS

Punt, A. and R. Hilborn. 2002. Bayesian stock assessment methods in fisheries. FAO Computerized Information Series (Fisheries) No. 12. 56 p.  
Hilborn, R. and M. Mangel. 1997. The Ecological Detective: confronting models with data. Princeton University Press, Princeton, N.J. 315 pps.  
Punt, A.E. and R. Hilborn. 1996. Biomass dynamics models. FAO Computerized Information Series (Fisheries). No. 10. Rome, FAO. 62p.  
Hilborn, R. and C. J. Walters. 1992. Quantitative Fisheries Stock Assessment: Choice, Dynamics and Uncertainty. Chapman and Hall, New York. 570 p. Also available in Russian.  
Bazykin, A., P. Bunnell, W.C. Clark, G.C. Gallopin, J. Gross, R. Hilborn, C.S. Holling, D.D. Jones, R.M. Peterman, J.E. Rabinovich, J.H. Steele, and C.J. Walters. 1978. Adaptive Environmental Assessment and Management. John Wiley and Sons, New York. 375 pps.

### 145 PUBLICATIONS IN REFEREED JOURNALS

#### National Research Council Reports

National Research Council. 2003. Cooperative Research with the National Marine Fisheries Service. NRC Press. 131 pps. Chairman of committee.  
National Research Council. 1998. Improving fish stock assessment. NRC Press. 188 pps. Member of Committee.  
National Research Council. 1998. Review of Northeast fishery stock assessments. NRC press. 136 pps. Member of committee.

#### 12 Book Chapters

#### 11 Reviews

#### 13 Papers in Peer Reviewed Conference Proceedings and Peer Reviewed Reports

#### 12 Popular Articles

**NAME** **RICHARD HENRY PARRISH**

**PRESENT POSITION:** Retired (Fisheries Biologist GS-14 (Research))  
National Oceanic & Atmospheric Administration  
National Marine Fisheries Service  
Southwest Fisheries Science Center  
Environmental Research Division  
1352 Lighthouse Avenue  
Pacific Grove, CA 93950-2097  
(831)648-9033

**DISCIPLINE** Fisheries Oceanography

**EDUCATION**

BA., Zoology, University of California, Berkeley, 1962  
MS., Fisheries & Wildlife, Oregon State University, 1966  
PhD., Fisheries with minors in Oceanography & Statistics, Oregon State Univ., 1977

**EXPERIENCE**

Dec 1975 – Mar 2006	Fisheries Biologist (Research) GS-14 Pacific Fisheries Environmental Group National Marine Fisheries Service Pacific Grove, California
May 72 - Jan 74	Manager Scientific Research (Oman Project). Del Monte Corporation San Francisco, California
Apr 69 - May 72	Associate Marine Biologist. Bottomfish Program California Dept. of Fish and Game, Monterey, California
Jul 66 - Apr 69	Assistant Marine Biologist. Pelagic Fish Program California Dept. of Fish and Game, Monterey, California
Sep 68 - May 72	Lecturer San Jose State University Moss Landing Marine Laboratory Moss Landing, California
Dec 62 - Jun 64	Lakes Management Research Officer Victoria Fisheries and Wildlife Department Melbourne, Australia.

**RESEARCH INTERESTS**

Population Dynamics	Marine Climatology	Commercial Fisheries
Resource Assessment	Fisheries Management	Marine Protected Areas

**HONORS AND AWARDS**

U.S. Department of Commerce, Lifetime Achievement Award 2005

Ricketts Memorial Lecture Award: For Exemplary Research in Marine Science;  
1994 Monterey Bay Research Symposium

U.S. Department of Commerce, Certificate of Recognition: Awarded for authoring  
a Publication on the Comparative Climatology of Eastern Boundary Currents.

**SELECTED SERVICE ON SCIENTIFIC COMMITTEES**

1979-81	INP/CalCOFI Modeling Subcommittee.
1981	IOC Committee on Climate Change and the Ocean (CCCCO) Biology Panel.
1981-3	IOC/SCOR Ocean Science in Relation to Living Resources (IOC Working Group-67).
1982-9	Chairman: NMFS Task Force on Strategic Planning for North Pacific Albacore.
1983-6	AGU Committee on Climate Variability of the Eastern Pacific and Western North America.
1987	NMFS External Review Committee for the SWFC Groundfish Program.
1993-4	PICES Working Group 3 (Dynamics of Small Pelagics in Coastal Ecosystems).
1993-7	SCOR Working Group 98 Worldwide Fluctuations of Sardine and Anchovy Populations.
1997	STAR Review Team for Widow and Chilepepper Rockfishes: Pacific Fisheries Management Council
1997-00	Coastal Pelagic Species Plan Development Team: Pacific Fisheries Management Council
1999-01	Marine Reserves Drafting Committee, Pacific Fisheries Management Council
2000-03.1	Master Team: California Marine Life Protection Act, Marine Protected Areas.
2005	Expert Reviewer: Portuguese Sardine Research Program, GLOBEC

**66 PUBLICATIONS on Climate, Ocean and Fisheries**

**NAME** **CARL J. WALTERS**

**FACULTY** Graduate Studies/Science

**DEPARTMENT & SCHOOL** Fisheries Centre/Zoology, University of British Columbia

**Present Rank:** Professor

**EDUCATION**

- a) **Undergraduate (where, dates, degree(s) received):**  
Bakersfield College, Bakersfield, California 9/61 - 9/63, AA  
Humboldt State College, Arcata, California 9/63 - 9/65, BS
- b) **Special Professional (e.g. Internships, Residencies, Specialty Boards):**  
National Science Foundation, Graduate Fellow, 1966-1969
- c) **Graduate (where, dates, degree(s) received):**  
Colorado State University, Fort Collins, Colorado 9/65 - 8/67, MS  
Colorado State University, Fort Collins, Colorado 9/67 - 6/69, Ph.D.
- d) **Titles of theses written for graduate degrees (indicate the degree; name and title of main supervisor for each):**  
Ms. - Distribution and production of midges in an alpine lake C.S.U., R.E. Vincent  
Ph.D. - Effects of fish introduction on invertebrate fauna of an alpine lake C.S.U., R.E. Vincent
- e) **Academic awards and distinctions (prior to final degree):**  
National Science Foundation Graduate Fellow, 1966-1969  
American Fisheries Society, Best Student Paper, 1968  
Various Scholastic Honors at Bakersfield and Humboldt State Colleges  
Student Body vice-president, Bakersfield College, 1962

**PROFESSIONAL EMPLOYMENT RECORD**

- a) **Teaching, professional or research positions held prior to U.B.C. appointment (indicate rank or title, dates and name of institution for each position held):**  
Seasonal Aide, June - Sept. 1963 and 1964, California Dept. of Fish & Game, Bishop, California.  
Student Assistant, Sept. 1964 - June 1965, Humboldt State College, Arcata, California  
4th yr. Fisheries Biology, Humboldt State, 1964-5 (labs, 1/2 lectures)  
Temporary Aide, Jan. 1966 - Sept. 1967, Colorado Game, Fish & Parks Department, Fort Collins, Colorado  
Graduate Fellow, Sept. 1967 - June 1969, Colorado State Univ., Fort Collins, Colorado  
Consultant, Dec. 1968-1970, Colorado State Univ., Fort Collins, Colorado  
Graduate Research Assistant, June 1966 - Sept. 1967, Colorado State Univ., Fort Collins, Colorado
- b) **Date of first appointment at The University of British Columbia:**  
July, 1969
- c) **Rank at which first appointed:**  
Assistant Professor
- d) **Subsequent ranks including dates of promotion:**  
Associate Professor, July 1977  
Professor, June 1982
- e) **Date of granting of Appointment without Term:**  
July, 1974
- f) **Principal University and Department teaching and service responsibilities over the last five years:**  
Applied Ecology (Biol. 408), Population Dynamics (Zool. 527)  
Fisheries population dynamics course (Fish. 505, Zool. 521)  
(have bought out teaching for past two years using Pew Fellowship)

## PROFESSIONAL ACTIVITIES

### a) Membership in professional and learned societies (including any offices held, committee memberships, etc.)

American Fisheries Society, AAS (not active)  
Associate Editor, Journal of Applied Mathematics and Computation, 1982 - present  
Associate Editor, Northwest Environmental Journal, 1985 - 1993  
Associate Editor, Environmental Software, 1986 - present  
Editorial Board, Canadian Journal of Fisheries and Aquatic Sciences  
Associate Editor, Environmental Management, 1995 - present  
Editorial Board, Conservation Ecology  
Editorial Board, Ecosystems

### b) Academic or professional awards and distinctions:

Wildlife Society award for best paper in fish ecology and management:  
Walters, C.J. and R. Hilborn. 1976. Adaptive control of fishing systems, J. Fish. Res. Bd. Canada 33(1): 145-159.  
Fellow of the Royal Society of Canada, Jan. 1998  
Pew Fellow in Marine Conservation, 2001-2004  
Mote Eminent Scholar, Florida State University and Mote Marine Laboratory, 2001-2002  
Murray A. Newman Award for Marine Conservation (Vancouver Aquarium), 2005

### c) Professional service and experience (consultancies, professional committees, commissions, visiting professorships, invited lectureships, etc.):

Member, National Research Council Grant Selection Committee for Population Biology, 1973-1976  
Research Scholar, International Institute for Applied Systems Analysis, Vienna, 1974-75 (Deputy project leader for ecology project involving six scientists)  
Adjunct Professor, Department of Zoology, University of Florida, 1989-1991  
Consultant to Environment Canada on Policy Planning & Research, 1972 to present  
Consultant to Government of US Fish & Wildlife Service, 1977-80  
Investigator for the Pearse Commission on Pacific Fisheries Policy, 1981  
Advisor on the Board of Technical Experts for the Great Lakes Fishery Commission 1980-82  
Director of Environmental & Social Systems Analysts Ltd. 1980-82  
Research Scholar & Project Leader for Adaptive Resource Policy Project, International Institute for Applied Systems Analysis, Vienna, 1982-83  
NSERC Strategic Grants Committee, Open Area (1984-87, Chairman 1985)  
NSERC Interdisciplinary Operating Grant Committee, 1992-1994  
Council Member, Pacific Fisheries Resource Conservation Council, 2001-2004  
Research Project Leader, stock assessment, Mote Marine Laboratory, 2004 to present  
Adjunct Professor, Fisheries and Aquatic Sciences, University of Florida, 2005-present

### d) Other public service:

Extensive fisheries advisory work for public agencies and industry groups.

## RESEARCH AND PROFESSIONALLY RELATED SCHOLARLY AND CREATIVE ACTIVITIES

### a) Areas of special interest and accomplishments in discipline:

I have been heavily involved in the development of rapid techniques for teaching systems analysis and mathematical modelling to biologists and resource managers, using problem-oriented workshops and seminars. I have conducted over two dozen three to ten day workshops in the past

ten years, first for the International Canadian Fisheries Service, US Fish and Wildlife Service, and the International Institute for Applied Systems Analysis.

My main research work now is on the theory of harvesting in natural resource management. I have published on applications of stochastic optimal control theory to the analysis of populations in variable environments, and my chief interest is in the basic problem of how to behave adaptively in the face of extreme uncertainty.

I also maintain an active field research program on the responses of aquatic communities to disturbances such as removal of selective species by introduced fish populations and enhancement of productivity through fertilization.

#### **PUBLICATIONS RECORD**

##### **a) 179 Publications or original works**

###### **Books**

\*Adaptive Management of Renewable Resources. 1986. MacMillan Pub. Co., Inc. N.Y. 374 pp.

\*Quantitative Fisheries Stock Assessment and Management. 1991. Chapman-Hall, Pub. Co., New York (Ray Hilborn, Carl Walters), 580 pp.

\*Fisheries Ecology and Management. 2004. Walters, C. and S. Martell. Princeton University Press, Princeton, 399p.

##### **b) 24 Completed and unpublished material including Commission Reports, Discussion Papers or similar material**





## Response to Letter O, from California Fisheries Coalition

**Response to Comment O-1:** The Department disagrees. The comment constitutes unsubstantiated narrative or opinion. The DEIR is based on a substantial amount of existing information that obviates the need for “new information.” The potential impacts are rigorously discussed in great detail. See also Master Response 2.0. Finally, CEQA is focused on the identification and evaluation of adverse impacts; there is no requirement to assess or compare potential benefits.

*No changes to the DEIR are required.*

**Response to Comment O-2:** The Department disagrees. The commenter does not provide any evidence to support the claim or refute the document. See also Response to Comment O-1.

*No changes to the DEIR are required.*

**Response to Comment O-3:** See Response to Comment M-1. The comment does not provide reference to existing models that should be used. See also Response to Comment O-1.

*No changes to the DEIR are required.*

**Response to Comment O-4:** See Response to Comment O-1.

*No changes to the DEIR are required.*

**Response to Comment O-5:** The EIR evaluates all potential impacts at a level of detail sufficient to make conclusions regarding significance; the commenter does not identify which impacts were reviewed in a cursory manner. See also Response to Comment O-1.

*No changes to the DEIR are required.*

**Response to Comment O-6:** The Department disagrees. The comment implies that the Proposed Project is being improperly segmented. There is no requirement in CEQA or the MLPA that prohibits the Commission from implementing the MLPA in a regional manner. Impacts of the project in combination with other existing and future MPA designations were explicitly addressed in Section 8.4 of the DEIR (Cumulative Impacts, beginning on page 8-2). Further, the MLPA expressly addresses the concepts of “regions” and “networks” [FGC Sections 2852(b), 2853(b)(6)], expressly authorizes regional networks [FGC Section 2856(a)(2)(D)], contemplates multiple networks [FGC Section 2857(c)], and the phasing in of MPAs, which is consistent with a regional approach [FGC Section 2857(e)]. The Marine Managed Area Improvement Act also contemplates “networks of sites” (Public Resources Code Section 36870).

*No changes to the DEIR are required.*

**Response to Comment O-7:** The comment appears to be addressing the proposed regulation implementing the preferred alternative, not this EIR. Moreover, it is unclear from where the commenter has taken this quotation. The Initial Statement of Reasons for this proposed Title 14 regulation states at section IV(c) "In view of information currently possessed, no reasonable alternative considered would be more effective in carrying out the purposes for which the regulation is proposed or would be as effective and less burdensome to the affected private persons than the proposed regulation." This is not the same as the quotation listed in the comment. Further, no alternative has been identified that would be more effective than the Proposed Project in carrying out the purposes of the MLPA or be as effective and less burdensome to the affected private persons.

*No changes to the DEIR are required.*

**Response to Comment O-8:** The DEIR considered all significant information presented to the Commission and EIR preparers during scoping, as is demonstrated in the responses given below. It is unclear which specific information the commenter is referring to.

*No changes to the DEIR are required.*

**Response to Comment O-9:** See Master Response 2.0. The Science Advisory Team guidelines were developed using a rigorous, science-based process, and were also peer reviewed by an independent panel established by Oregon Seagrant and the DEIR preparers for adequacy prior to inclusion in the EIR. The DEIR adequately considers all of the topics discussed in this comment: adult movement, protection levels, population dynamics, the extent of closures by habitat type, the effects of displacement, and project alternatives. The DEIR is complete, accurate, and legally adequate, and the comment provides no specific information to allow an alternate conclusion.

*No changes to the DEIR are required.*

**Response to Comment O-10:** See Response to Comment O-1. The discussion of a fourfold increase in productivity under Impact BIO-1 of the DEIR is based on published empirical data regarding reserves worldwide. The DEIR does not make any specific conclusions regarding the productivity of the MPAs that would be designated under the project. As discussed in the DEIR, existing empirical data suggest that enhanced production within reserves can more than compensate for the effects of displaced fishing effort even with up to 50 percent of the fishing area closed. Finally, the DEIR makes the conservative assumption that fishing effort is unchanged to allow consideration of worst-case impacts. The comment provides only assertions, but no evidence to refute any of the assumptions or conclusions presented in the DEIR.

*No changes to the DEIR are required.*

**Response to Comment O-11:** As required by CEQA, the DEIR considers the No Project alternative, which includes existing regulations. The DEIR concludes that this alternative would not be as effective as the Proposed Project at meeting the goals of the MLPA, nor would it meet the most basic requirement of the MLPA, that is, the improvement of the existing array of MPAs and development of a scientifically based network. See also Master Response 5.0.

*No changes to the DEIR are required.*

**Response to Comment O-12:** The impacts associated with increasing the number of replicates are anticipated to be largely beneficial. Any potentially adverse effects, such as displacement of fishing, have been extensively evaluated in the DEIR. See also Response to Comment O-6.

*No changes to the DEIR are required.*

**Response to Comment O-13:** The information referenced by the commenter was considered during preparation of the DEIR. However, it is unclear how this information relates to any of the impact analyses presented in the DEIR. Rather, the commenter seems to be calling into question the goals of the MLPA and whether the project as proposed will be effective in meeting those goals. The overarching goal of the MLPA is to protect marine habitats and ecosystems, and the Proposed Project has been determined to be effective in meeting that goal. See also Master Response 1.0.

*No changes to the DEIR are required.*

**Response to Comment O-14:** CEQA is focused on the identification and evaluation of adverse impacts; there is no requirement to provide a detailed assessment of project benefits. In addition, CEQA does not require an evaluation of socio-economics per se, but does extend to the secondary effects of socio-economic influences, where they would have a measurable effect on the physical environment. The DEIR provides a detailed evaluation of impacts related to socio-economic considerations (see Chapter 4 of the DEIR and related impact analyses). See Master Response 3.0.

*No changes to the DEIR are required.*

**Response to Comment O-15:** Please refer to Response to Comment O-10.

*No changes to the DEIR are required.*

**Response to Comment O-16:** The Department disagrees. The DEIR is neither incomplete, inaccurate nor fatally flawed, and meets the legal requirements of CEQA in presenting information for the Commission. The commenter does not provide evidence to support their claim. See also Response to Comment O-1.

*No changes to the DEIR are required.*

**Response to Comment O-17:** See also Master Response 2.0. The DEIR was prepared in part by fisheries biologists with advanced degrees and decades of experience with marine biology and ecological theory. These biologists had a more than adequate background to prepare the DEIR. Please see Response to Comment O-18 for a discussion of the other issue addressed in this comment.

*No changes to the DEIR are required.*

**Response to Comment O-18:** The comment incorrectly presumes that MPAs must exclusively have a fishery conservation and management function in order to be successful. In fact, the MLPA expressly identifies broader goals for the Marine Life Protection Program that include, but are not limited to, fishery management concerns. See Fish and Game Code Section 2853(b)(1)-(6). Moreover, CEQA is focused on the identification and evaluation of adverse impacts; there is no requirement to provide a detailed assessment of project benefits. The assumptions in the DEIR regarding the degree of “spillover” are well supported by published literature and provide adequate information to evaluate the potential effects related to displacement of fishing effort.

*No changes to the DEIR are required.*

**Response to Comment O-19:** The DEIR provides sufficient information for the Commission to distinguish between the environmental impacts of the various alternatives and support the selection of a preferred alternative.

*No changes to the DEIR are required.*

**Response to Comment O-20:** The impact discussion presented in Impact BIO-1 of the DEIR makes use of extensive published scientific data in making its conclusions. The commenter provides no evidence to refute the conclusions of the DEIR.

*No changes to the DEIR are required.*

**Response to Comment O-21:** Existing fishing regulations were considered as part of the baseline conditions for impact analysis. See Master Response 5.0. Regarding spillover, the commenter provides no evidence to support its assertions, and seems to overlook the fact that nowhere in the MLPA does it state that MPAs are intended to achieve pre-exploitation abundance levels or age structures. Finally, the comment incorrectly identifies errors in assumptions regarding fish density; the DEIR does not make any definitive conclusions regarding fish density outside of the MPA. However, various assumptions are used to evaluate potential worst-case displacement effects; one such assumption is that the MPA does not reduce the overall harvest, which is indeed consistent with the quotation from Hilborn et al.

*No changes to the DEIR are required.*

**Response to Comment O-22:** Once again, the commenter is confused regarding the purpose of CEQA, which is to evaluate adverse environmental impacts. Rather, the commenter focuses on the methodologies which could have been used to quantify the beneficial impacts of the Proposed Project. Such analyses are not necessary to make impact conclusions under CEQA. Where the referenced analysis on spillover is used to evaluate the potential for displacement effects on fish populations outside of MPAs, the DEIR uses extensive published scientific data in making its conclusions. Further, the effect on populations outside of MPAs is not only dependent on species behavior, but also on the reactions of fishermen to MPAs, which is speculative at best and seems to have been entirely overlooked by the commenter. The DEIR presents a legally adequate analysis that provides a scientifically valid and defensible approach to the impact analysis.

*No changes to the DEIR are required.*

**Response to Comment O-23:** The commenter is confused in that the DEIR does not make conclusions regarding fishing effort, nor are such conclusions germane to the impact analysis. Rather, the DEIR evaluates the ecological effects on areas outside of the MPAs assuming that catch remains constant, an assumption which is supported by the commenter earlier when quoting Hilborn et al. regarding quotas being the driving force behind catch.

Increases in fishing effort, rather than having biological effects, are more likely to have economic effects, such as fuel costs, which are not appropriate to a CEQA analysis. In addition, they could have secondary impacts, such as vessel emissions and vessel traffic, which are evaluated in the DEIR.

*No changes to the DEIR are required.*

**Response to Comment O-24:** The analysis in the DEIR regarding spillover is not intended to address sedentary species or species with limited mobility. Rather, effects on fishing for such species as a result of MPA designation are anticipated to be minimal due to the redundancy between the proposed MPAs and existing restrictions for such species (e.g., rockfish conservation area restrictions), and the fact that the MPAs as proposed have minimal overlap with the most important areas for commercial and recreational harvest of these species.

*No changes to the DEIR are required.*

**Response to Comment O-25:** While the commenter is correct that production is density dependent, this factor is not anticipated to be of substantial consequence related to production in the MPAs. The species under consideration in this analysis are mobile and would be anticipated to disperse into the surrounding non-designated areas where densities are lower and competition for resources is reduced. In the absence of

fishing, this would have the tendency to result in a uniform density across both designated and non-designated areas, and absent other controls on population (e.g., predation, abundance of resources), populations would ultimately increase to the point where density would affect production. However, harvest outside of MPAs is anticipated to result in non-designated areas continuing to serve as population sinks, resulting in ongoing dispersal of fish from MPAs to other areas. There is therefore little potential for densities in MPAs to increase to a level where production would be decreased. The commenter's assumption that MPAs will have near-virgin population densities is flawed.

*No changes to the DEIR are required.*

**Response to Comment O-26:** By commenting on larval transport, the commenter is addressing the efficacy of reserve design in bolstering fish populations. While this is one important topic that was considered by the Department in identifying the preferred alternative, it was not the sole factor driving the proposed MPA designations. Other factors, as the commenter notes, include social, economic and cultural considerations. In addition, because this comment focuses on the ecological benefits of the project, rather than any adverse impacts of the project, it is not a subject that is appropriate to a CEQA analysis. For this reason, no further response is warranted.

*No changes to the DEIR are required.*

**Response to Comment O-27:** The commenter provides no evidence that the areas that would be designated as MPAs between Point Sur and Point Conception are the "most productive habitat in the area." In fact, data analyzed during the project selection show that the locations with the highest fish take are outside the proposed MPA boundaries, suggesting that the most productive areas are also outside the MPAs. Please see prior responses regarding the DEIR's analysis of potential displacement of fishing effort.

*No changes to the DEIR are required.*

**Response to Comment O-28:** As the commenter states, the SAT guidelines were not the sole consideration in determining the location and configuration of MPAs. However, the guidelines were indeed considered as part of the decision-making process. The guidelines were not "abandoned" as the commenter suggests, and no justification is therefore warranted.

*No changes to the DEIR are required.*

**Response to Comment O-29:** See Master Response 3.0. The DEIR provides an extensive analysis of the potential for impacts to fishing communities and the region, including an evaluation of cumulative impacts. The Department disagrees that the

DEIR's findings are flawed or that the socio-economic assessment was inadequate, and the commenter does not provide evidence to support this assertion.

*No changes to the DEIR are required.*

**Response to Comment O-30:** The protection levels identified by the SAT were intended to be qualitative and were used for comparative purposes to discriminate between the various types of MPAs. They were not intended to refer to specific levels of protection. It is unclear based on the comment how the DEIR might be deficient in its consideration of protection levels, since the commenter does not provide any specific information regarding what, if any, adverse impacts were not considered, or were inadequately considered, in the DEIR. The comment mentions the relationship between recreational fishing and populations on the continental shelf, as well as the relationship between kelp harvest and deep slope species. However, it does not provide information suggesting that there are adverse impacts associated with these issues. The DEIR, on the other hand, provides a complete and legally adequate analysis of adverse impacts.

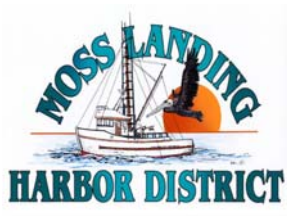
*No changes to the DEIR are required.*

**Response to Comment O-31:** The DEIR provides a complete and legally adequate analysis of direct and indirect environmental impacts, mitigation measures, and alternatives. As shown through the responses provided above, the Department disagrees that the DEIR has “glaring omissions and deficiencies.” All issues brought forward during DEIR scoping were considered in preparation of the document.

As discussed above, the commenter states that the DEIR is deficient in defining and analyzing protection levels, but does not provide substantial evidence to support this claim. Indeed, the commenter fails to provide any substantive information suggesting that there are reasonably foreseeable impacts that were not evaluated in the DEIR relative to this issue. Displaced fishing effort, in particular, was discussed in detail in the DEIR.

The Department disagrees that the MPA network will be ineffective or detrimental in achieving MLPA goals. On the contrary, the Department believes that the Proposed Project is the alternative that best achieves the multiple goals of the MLPA, and was designed to avoid unnecessary ecological or economic impacts. The DEIR uses accurate information to provide a complete and legally adequate analysis, and provides sufficient information for the Commission to make a determination regarding the project.

*No changes to the DEIR are required.*



**BOARD OF COMMISSIONERS**  
Russell Jeffries  
Margaret Shirrel, Ph D.  
Yohn Gideon  
Vincent Ferrante  
Frank Gomes, Jr.

7881 SANDHOLDT ROAD  
MOSS LANDING, CA 95039

TELEPHONE – 831.633.5417  
FACSIMILE – 831.633.4537

**Letter P**

**GENERAL MANAGER  
HARBORMASTER**

Linda G. McIntyre, Esq.

December 29, 2006

Gary Stacey, Regional Manager  
Marine Region  
California Department of Fish & Game  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

Re: MLPA Draft EIR CEQA Comments

Dear Mr. Stacey:

Please be advised that the Moss Landing Harbor District concurs with the comments on the Draft EIR forwarded on December 18, 2006 in a letter directed to John Ugoretz from the Port San Luis Harbor District.

P-1

Sincerely,

**Moss Landing Harbor District**

Linda G. McIntyre  
General Manager/Harbormaster

LGM:mdm

C: Board of Commissioners, Moss Landing Harbor District



## **Response to Letter P, from Moss Landing Harbor District**

**Response to Comment P-1:** Comment Noted.

*No changes to the DEIR are required.*

**Letter Q**

December 29, 2006

MLPA Central Coast CEQA  
California Department of Fish & Game  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

RE: Comments on draft EIR for the Central Coast Marine Protected Areas Project (State Clearinghouse #2006072060)

To Whom It May Concern:

Thank you for the opportunity to comment on the draft Environmental Impact Report (EIR) for the California Marine Life Protection Act Initiative, Central Coast Marine Protected Areas Project (MPA).

The Monterey Bay Aquarium Research Institute (MBARI) has conducted important marine research in and around Monterey Bay for nearly 20 years. Previously, MBARI submitted a letter to the Department of Fish & Game (dated April 13, 2006) after reviewing the Blue Ribbon Task Force recommendations for California MPAs. A copy of this letter is attached for reference.

As stated in our previous letter, MBARI scientists are dedicated to improving scientific understanding of marine biology, chemistry, and geology. This research is invaluable to the oceanographic community and can provide critical information to agencies managing MPAs. While we greatly appreciate the emphasis placed on providing research opportunities with the establishment of new MPAs, the concerns expressed in our previous letter are still valid, and we are hoping our questions regarding permitting in MPAs can be answered in the final version of the EIR. In addition to these concerns, MBARI seeks clarification regarding Section 7.5, and the related Section 7.5.3.2 of the draft EIR.

Q-1

Section 7.5 of the draft EIR discusses research and education activities and potential impacts if the proposed plans are adopted. A reduction in research and education opportunities is listed as a significant impact. MBARI participates in long-term monitoring programs in various regions off the coast of California. New research programs commence on a regular basis as well. These existing and future research activities involve a variety of instrumentation deployments and sample collections to gather data. Some are short term deployments with full equipment recovery at the end of the experiment. Other deployments require that we leave the anchor behind when recovering instrumentation due to weight limits that make anchor recovery impossible. This research nets extremely valuable scientific data about the resource being managed.

Q-2

Without these tools to aid in data collection, this research would not be possible. Please clarify in the document if these types of activities will be permitted in the proposed MPAs. If they are not allowed, it is possible that scientific research could be negatively impacted due to a decrease in research opportunities.

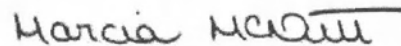
Q-2  
Continued

Similarly, Section 7.5.3.2 states, "Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource, are categorically exempt under CEQA..." This is a reasonable concept, but it remains unclear how a "serious or major disturbance" will be defined. An activity that seems benign to one person or agency may be deemed serious by another. How will it be decided if our research falls into this category, and who will decide this? It is difficult for our researchers to determine if the proposed MPAs will significantly impact their research programs when it is unclear what the specific regulations will be and how they will be applied to their programs. Any clarification you can provide would be very helpful.

Q-3

Thank you for the opportunity to provide these comments. MBARI would be happy to discuss this further with the appropriate staff as directed.

Sincerely yours,



Marcia McNutt  
President and CEO

**Response to Letter Q, from Monterey Bay Aquarium Research Institute**

**Response to Comment Q-1:** Permitting for the take of living marine resources within MPAs falls under the general scientific collecting permitting process. While additional permits are not necessary, collection of specimens from within MPAs is regularly limited to those that would be unavailable outside the MPA, or those for which collection from a specific location within the MPA is necessary. The MLPA expressly authorizes scientific collecting, even in State Marine Reserves (FGC Section 2860).

*No changes to the DEIR are required.*

**Response to Comment Q-2:** As noted above, permitting falls under the general scientific collecting permitting process. Scientific research and monitoring within MPAs is encouraged and is a goal of the MLPA. Proposed activities are reviewed on a case-by-case basis as with all permit applications. As identified in the discussion of Impact RES-1 of the DEIR (beginning on page 7-46), research and education opportunities would not be adversely affected by the Proposed Project.

*No changes to the DEIR are required.*

**Response to Comment Q-3:** The identified quote from the DEIR references CEQA review requirements, and the determination of a “serious or major disturbance” would be made by the lead agency completing the review. This does not speak to the permitting of scientific research within MPAs, which will be reviewed on a case-by-case basis as noted above.

*No changes to the DEIR are required.*



# Letter R

## Pacific Fishery Management Council

7700 NE Ambassador Place, Suite 101, Portland, OR 97220-1384  
Phone 503-820-2280 | Toll free 866-806-7204 | Fax 503-820-2299 | [www.pcouncil.org](http://www.pcouncil.org)

December 29, 2006

MLPA CEQA Comments  
c/o Mr. Gary Stacey  
Regional Manager, Marine Region  
California Department of Fish and Game  
Marine Region  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

Re: Pacific Fishery Management Council comments on the California Environmental Quality Act document *Draft Environmental Impact Report, California Marine Life Protection Act Initiative, Central Coast Marine Protected Areas Project*.

Dear Mr. Stacey:

Thank you for your letter and the opportunity to review and comment on the Draft Environmental Impact Report (EIR) for the California Marine Life Protection Act Initiative (MLPA) Central Coast Marine Protected Areas Project. The Pacific Fishery Management Council (Council) did not meet during the EIR 45 day review period beginning on November 17, 2006 making a formal and comprehensive review impossible. However, on behalf of the Council, I would like to take this opportunity to provide the following general comments on the EIR.

During the scoping period for the California Environmental Quality Act (CEQA) analysis, we submitted a letter dated August 1, 2006 requesting the resulting document include "sections covering potentially adverse and beneficial biological effects on Federally managed fish stocks and socioeconomic effects on communities and fishery participants with interests in Federally managed fisheries." The draft EIR has no section specific to this request but, does provide brief descriptions and analyses of some Federally managed fisheries and fish stocks in Chapter 4 and Chapter 6. We encourage more in depth analysis be included in the final EIR to improve final decision making capabilities.

R-1

The draft EIR acknowledges the importance of commercial fisheries to the nation's economy, but presents little analysis of the impacts of the proposed MPAs on commercial fisheries. Although not explicitly required by CEQA, socioeconomic impacts to fisherman and fishing communities are a vital part of the Council's decision making process and warrant a more thorough discussion and treatment in the draft EIR. Additionally, it is unclear why the reported declining trend in commercial and recreational fishing effort are cited more heavily in the document than estimated economic impacts when, particularly for commercial fisheries, reduced capacity is a goal of sustainable fishery management rather than an indication of a declining importance of the fishing

R-2

industry. We recommend the final EIR contain additional analysis for more informed decision making.

R-2  
Continued

The Council remains supportive of a comprehensive MLPA process and the potential use of marine protected areas in the management of marine resources and fisheries. However, the Council believes many of the true benefits to living marine resources and the costs to marine-based economies are as yet unknown or undocumented. A critical aspect of the implementation of marine protected areas is an effective research and monitoring plan. Research on the effects of displaced fishing effort or the ability of MPAs to preserve populations within their boundaries or enhance those outside are subjects of great interest to the Council. Section 2.6.3 lists many goals of a proposed monitoring program that has yet to have implementation detail and certainty of occurrence. The Council emphasizes the importance of research and monitoring and believes a well designed and funded monitoring program should be in place for a scientifically defensible period of time before a decision to move forward with any proposed MPAs is made.

R-3

Finally, effective fishery management requires adequate enforcement capabilities. The Council and National Marine Fisheries Service have traditionally relied on cooperative agreements between Federal and State enforcement agencies. The implementation of a network of MPAs will likely place an additional burden on existing enforcement capabilities. The Council understands the importance of enforcement to the success of MPA management strategies, but would not be supportive of achieving this goal through a reduction in the enforcement of existing fishery regulations. We recommend the final EIR analyze the effects of variable levels of enforcement funding on program goals, to improve final decision making capabilities.

R-4

Again, I want to thank you for the opportunity to comment on the EIR for the Central Coast Marine Protected Areas Project Review. It is unfortunate the full Council and its advisory bodies did not have the opportunity to apply their broad range of expertise to this review. If you have questions, please contact me, or Mr. Mike Burner, the lead Staff Officer on this matter at 503-820-2280.

Sincerely,



Donald McIsaac, PhD.

MDB:sks

c: Council Members

Mr. Mike Chrisman, Secretary for Resources, State of California

Mr. L. Ryan Broddrick, Director, California Department of Fish and Game

Mr. Robert Treanor, Executive Director, California Fish and Game Commission

Mr. John Ugoretz, Marine Region, Nearshore Ecosystem Coordinator, California Department of Fish and Game

**Response to Letter R, from Pacific Fishery Management Council**

**Response to Comment R-1:** Comment noted. However, because the requested changes would not fundamentally alter the impact analysis in the DEIR, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment R-2:** The Department disagrees. A lengthy discussion of potential impacts to fisheries is provided on pages 4-22 to 4-28. Note that economic impacts are not a topic of analysis that is addressed under CEQA.

*No changes to the DEIR are required.*

**Response to Comment R-3:** While the Department agrees that a fully developed monitoring program is essential, we disagree that this program must be in place "for a scientifically defensible period of time before a decision to move forward with any proposed MPAs is made". The MLPA specifically requires that MPAs be developed using "best readily available science". The phrase readily available reinforces the concept that action need not wait for the development of new scientific data. In fact, one intent of the MLPA is to allow MPAs to be used as scientific reference. See Master Response 2.0.

*No changes to the DEIR are required.*

**Response to Comment R-4:** The Department has received additional funds and enforcement positions to assist with the implementation of MLPA. Project funding is not a topic that is appropriate for CEQA analysis.

*No changes to the DEIR are required.*

**Letter s****Jeff Thomas****Subject:** FW: MLPAComments: MLPA CEQA Comments

**From:** "william james" <[halibutbill@msn.com](mailto:halibutbill@msn.com)>  
**Date:** December 30, 2006 10:05:23 AM PST  
**To:** <[MLPAComments@resources.ca.gov](mailto:MLPAComments@resources.ca.gov)>  
**Cc:** <[hALIBUTBILL@msn.com](mailto:hALIBUTBILL@msn.com)>  
**Subject:** MLPAComments: MLPA CEQA Comments

From Bill James 1038 5th street #3 Crescent City, California 95531 707-465-5347. Regarding Environmental Impacts The impacts of Fishing Displacement and the resulting Fishing Congestion are in no way being estimated nearly as severe as the environmental impacts will actually be. I speak as a fishermen who has fished in the Avila-Morro Bay region consistently from 1988- 2003 for the Nearshore Finfish Species and California Halibut. Fishermen will be displaced from the higher relief- more productive reefs to lower relief - less productive reefs in the area from Pt Purisma to Piedras Blancas. The resulting shift of effort will definitely increase the catch ( bycatch) of Canary Rockfish which is listed as a Federal Overfished species. This is against Federal Law ( Magnuson Stevens Conservation Act). Canary Rockfish in the Avila Morro Bay area are presently inhabiting the lower relief rocks- mud interface areas in waters greater than 10 fathoms (approx. 20 meters)- to water exceeding 100 fathoms. Fishermen that used to catch their limits of large fish in 3 hours in areas that will be closed off due to the Preferred alternative MPA network being put into place will be forced to fish in less productive waters with smaller fish in their limit. This will also cause excessive Bycatch of other rockfish ( Nearshore -Shelf species) as fishermen try to catch larger fish that they used to catch. In waters over 20 fathoms (120 ft) there is a high mortality among rockfish with swim bladders. Increased bycatch is also against provisions in the Federal Sustainable Fisheries Act of 1996. Even in the CEQA analysis there is a minimum 5 year period before any presumed spillover into fisher areas will occur. Canary Rockfish will be in the Overfished Category for at least that minimum period ( five years) there could be a violation of Federal Law for that period. I would be happy to discuss this further. Bill James 707-465 5347. PS a more detailed explanation will be prepared in January as the Dec 31 deadline is during the Holidays.

S-1



**Response to Letter S, from Bill James**

**Response to Comment S-1:** The Department disagrees. The potential for increased bycatch of Canary rockfish resulting from displacement of fisherman is speculative, and the commenter does not provide any evidence to substantiate such a claim. Conversely, the document describes the amount of habitat and numbers of fishing trips potentially impacted by the Proposed Project. There is no evidence that shows effort shifts will have a negative impact or increase catch of canary rockfish. A review of canary rockfish “hotspot” fishing data indicates that most locations for this species are north of and outside the Proposed Project area. Furthermore, many of the remaining hotspot locations found inside the Proposed Project area reside within the boundaries of the proposed MPAs or in locations that already have a high level of fishing effort.

*No changes to the DEIR are required.*

December 31, 2006

MLPA Central Coast CEQA and Draft Monitoring Plan  
California Department of Fish & Game  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

To the California Department of Fish and Game:

On behalf of the Non-Consumptive Recreational SCUBA Diver Representatives and our more than 60,000 or more SCUBA divers regularly diving the Central Coast MLPA Region, we would like to offer some comments on the Draft Environmental Impact Report (DEIR) for the California Marine Life Protection Act Initiative Central Coast Marine Protected Areas Project. The Non-Consumptive Diver Representatives were involved with this process and have been involved in an effort to establish a Marine Reserve in the Proposed Project Area for nearly fifteen years. While we support the Proposed Marine Protected Areas in general because it will provide substantial benefits to the state of California by protecting marine life and underwater habitats, we do have some concerns regarding some the proposed marine protected areas in the Monterey and Carmel Bays.

We believe that the DEIR provides a sound foundation for the fulfillment of the California Environmental Quality Act (CEQA) for the protection and restoration of the ecosystem, marginally protects the wildlife and marine species from over consumption. In this light, we would like to point out to the Department Staff and the F&G Commissioners, that the CEQA identifies Alternative 2 as the “environmentally superior alternative” and that Alternative 1 “falls short of meeting the MLPA intent for a cohesive biological network,” and that the Proposed Project has been determined to be “the most likely to achieve the full range of MLPA goals and objectives.” In summary, the Proposed Alternative and the network of marine protected areas will benefit the marine environment and the population of the State of California by helping to restore the ecosystem, protect biodiversity.

T-1

## Consumptive Uses and Socioeconomic Considerations

While CEQA does not require the consideration of direct economic or social factors in its impact analyses, the DEIR does go into these consideration for the Commercial fishing industry. The MLPAL process has from its inception struggled to consider Social and Economic contribution from and for the Non-Consumptive users of the coastline. The benefits and adverse impacts to this constituency go unanswered as we move towards implementation. In fact, though the members of the Central Coast Regional Stakeholder Group wrestled with the challenges provided by Goal Three of the MLPA, and found agreement in the Goals and Objectives Statements in response to these concerns, the DFG and MLPAL Staffs, and the F&G Commission failed to give any significance to these efforts

T-2

brought about after much discussion, negotiation and compromise among the CCRSG representing all vested interests. As a result, a significant constituency, representing an overwhelming portion of the State's population has been left without consideration for their Non-Consumptive activities, and without consideration for the significant economic contribution to the Central Coast economy. Instead of providing for the considerations given within Goal Three of the Act, which would make adjustments for Non-consumptive activities which would have a lesser adverse environmental impact, the DEIR focuses on Consumptive activities and the "economic impact" on the extractors. The DEIR identifies the physical displacement of fishing effort as a potential impact to the environment, however, there is no evidence that displacement from any of the alternatives considered in the DEIR will have significant environmental effects, and therefore mitigation measures are not required.

T-2  
Continued

A major concern for the Non-Consumptive Recreational SCUBA community is the environmental impact which will be caused by affects of the proposed regulations for kelp harvesting in kelp bed 220.

The draft kelp harvesting regulations for the Ricketts SMCA state: "Any licensed commercial kelp harvester may take no more than 12 tons of kelp... in any calendar month." The limit is per harvester, and does not limit the total kelp take in the reserve, and the harvest limit per harvester is much greater than the current total harvesting rate. The new allowable take area will be lesser in kelp bed 220, with the new proposed Lovers Point SMR and the Asilomar SMR no longer available to kelp harvesting. This will focus all the kelp harvesting in the Ed Ricketts SMCA and the Pacific Grove Fish Gardens SMCA. The results of these news kelp harvesting limitations will adversely impact the marine life in the area, as will as adversely affect the socioeconomic well being for this highly used tourist area, and Non-Consumptive Recreational use area.

T-3

By their own records, the abalone-farming companies in Monterey report they harvest only small quantities of kelp from the Cannery Row and Lover's Point areas. They estimated it comprised just over 15% of their use during the months of November through March and far less during other months. The total November through March take averages less than two and a half tons of kelp per month (based on records from 2001-2004, Art Seavey, pers. comm., March 2005). The maximum take was 4.08 tons per month. We further note that these businesses formed the "Monterey Kelp Collective" and have, for a decade, successfully convinced the Monterey Bay National Marine Sanctuary to base its kelp policy on the existence of a single entity (the Collective) which effective shares kelp taken from this area among all those with a need to use the resource.

Harvest rate limits are important because even small-scale hand harvesting can have a visible impact on the extent of the kelp beds, and because many animals depend on the upper kelp canopy as their primary habitat. For instance, several

species of juvenile rockfish inhabit the kelp canopy, including juvenile Black & Yellow, Kelp, Gopher, Redbanded, Flag, Treefish and Splitnose rockfish species, with juvenile Black, Bocaccio and Olive rockfish species feeding in the canopy (Tom Laidig, NOAA biologist, July 2006 presentation: "Juvenile Rockfish of California").

T-3  
Continued

On this basis, we recommend that an aggregate monthly limit be set on the kelp harvest within the Ricketts SMCA. Even accounting for business growth, we can find no justification for a monthly limit on total quantity allowable to all harvesters in aggregate to be much greater than the historical maximum of 4.08 tons from Monterey to Lovers' Point.

We therefore recommend that the language be revised as follows: 1st sentence unchanged (restricts kelp harvesting to the north portion of Ricketts SMCA). Revise 2nd sentence as follows "The total monthly harvest by all licensed commercial kelp harvesters combined shall not exceed 6 tons of kelp from the portion of Administrative Kelp Bed 220 within the Edward F. Ricketts State Marine Conservation Area."

We also note that the regulatory language for the Pacific Grove SMCA suffers from the same shortcoming. The monthly limit should be for all kelp harvesters combined, not per harvester, and should be set at 40 tons total per month, not 44 tons per harvester.

T-4

Respectfully submitted,  
Jesús C. Ruiz  
Former MLPA CCRSG Diver Representative  
Former MLPA Statewide Interest Group Representative

**Response to Letter T, from Jesus Ruiz****Response to Comment T-1:** Comment Noted.

*No changes to the DEIR are required.*

**Response to Comment T-2:** The commenter is incorrect. Displacement of fishing effort itself is not a potential environmental impact. The DEIR identifies the displacement of fishing effort as potentially contributing to impacts on the physical environment.

*No changes to the DEIR are required.*

**Response to Comment T-3:** The proposed monthly caps on harvest by any individual, along with the proposed restriction to hand harvest only, are specifically designed to address the commenter's concern regarding potential kelp harvest effects on marine life. In combination, the monthly cap and hand harvest will ensure that no negative impact to the kelp resource or constituencies that depend upon it for socioeconomic gain occurs. While the total area allowed for take will decline, the effectively harvestable area will only be reduced by the portion of the Lovers Point SMR between the existing Hopkins SMR boundary and Lovers Point. Hand harvest ensures that most organisms, especially mobile vertebrates, are not taken along with kelp.

The commenter also is directed to the Initial Statement of Reasons for Regulatory Action that describes the proposed revised regulations with respect to kelp harvest. This document can be obtained thru the MLPA website:  
<http://www.dfg.ca.gov/MRD/mlpa/>.

*No changes to the DEIR are required.*

**Response to Comments T-4:** See Response to Comment T-3.

*No changes to the DEIR are required.*

**Letter U****Jeff Thomas**


---

**From:** John R. Wolfe [jwolfe@igc.org]  
**Sent:** Monday, January 01, 2007 9:23 PM  
**To:** John Ugoretz; FGC; MLPAComments@resources.ca.gov  
**Cc:** Marc Shargel; yscuba; mark St. Angelo; Karen Garrison; Kaitilin Gaffney  
**Subject:** Chapter 9 of MLPA Central Coast CEQA

To: California Department of Fish and Game:  
 Re: CEQA for Central Coast MLPA

Dear DFG Staff and Commissioners:

I have just had the opportunity to review the December 28, 2006, comments by NRDC, Ocean Conservancy and The Otter Project on the CEQA for the Central Coast MLPA. Their comments are compelling, and I trust those comments will be incorporated into the final CEQA report.

U-1

In light of those comments, it's important to note that Table 9-1 in Chapter 9 of the CEQA should also be revised as follows:

**Air Quality:** for all three alternatives, the impacts should be shown as LTS (Less Than Significant) rather than SU (Significant Unavoidable). At the very least, given the uncertainty of predicting fishing fleet travel, the impact should be shown as "LTS to SU". Per NRDC's comments, it is not defensible to assert that the impact is "SU". Note that in the long term, fishing fleet travel (and associated air pollution) may very well decrease as fish reproductive stock protected in the reserves creates larger more stable fish populations in accessible fishing grounds closer to port.

U-2

**Biological Resources:** denoting all three alternatives as "LTS to B" disregards the difference in the potential beneficial impacts between the three alternatives. There are two choices here: designate the Proposed Project and Alternative 2 as "B" while designating Alternative 1 as "LTS", based on the existing literature of the beneficial effects of marine reserves at required thresh-hold percentages of the total area protected. The second choice would be to add a footnote stating that while it is not yet known whether the MPAs will have a significant beneficial impact on overall populations, they will certainly have a beneficial impact on populations in local protected areas, and that benefit increases with area protected. The three alternatives can therefore be ranked, from most to least significant benefit to biological resources as Alternative 2 > Proposed Project > Alternative 1.

U-3

**Research and Education:** because the amount of protected area in Alternative 1 is so much less than Alternative 2 or the Proposed Project, Alternative 1 should be listed as "NI" while the Proposed Project and Alternative 2 will protect sufficient areas to support comparative research endeavors, and should be designated "B".

U-4

**Vessel Traffic:** we agree with the designation of "LTS" here for all three alternatives. If this category reflects the amount of vessel traffic, then "LTS" here is inconsistent with "SU" in Air Quality, since vessel traffic generates the air pollution of concern in the Air Quality category. Therefore, Air Quality should also be listed as "LTS".

U-5

Finally, Chapter 9 would benefit from a second table, ranking the Proposed Project and the two Alternatives for each of the six project goals described at the beginning of the chapter. For each of the six goals, most

U-6

would concur that Alternative 2 ranks higher than the Proposed Project, which in turn ranks higher than Alternative 1, which in turn ranks higher than "No Project."

U-6  
Continued

I hope my comments on Chapter 9 of the CEQA are considered helpful, and are incorporated into the final document.

Respectfully submitted,

John R. Wolfe SE

Diver Representative, MLPA Central Coast Region Stakeholder Group

**Response to Letter U, from John Wolfe**

**Response to Comment U-1:** Comment noted. See responses to comment Letter N.

*No changes to the DEIR are required.*

**Response to Comment U-2:** See Response to Comment N-15.

*No changes to the DEIR are required.*

**Response to Comment U-3:** Ranking of the level of benefit of various alternatives is not a requirement of CEQA. That said, Section 6.1 of the DEIR (beginning on page 6-27) provides a discussion and comparison of the beneficial effects anticipated by the Proposed Project and Alternatives 1 and 2 based on the type of habitat protected and the associated level of protection (no-take versus limited take) relative to the MLPA goals and other fishery management regulations.

*No changes to the DEIR are required.*

**Response to Comment U-4:** The degree to which the Proposed Project or any alternative provides a greater benefit to research and education opportunities is speculative, and the commenter does not provide any evidence to support an alternate conclusion. The DEIR appropriately concluded that for each alternative there would be either no impact (NI) or beneficial (B) effects to research and education.

*No changes to the DEIR are required.*

**Response to Comment U-5:** The effects identified in the comment do not directly correlate with each other. A less than significant vessel traffic impact is not the same as less vessel traffic. Section 7.6 of the DEIR (vessel traffic) addresses impacts resulting from the increase in vessel density and oceanic hazards. These effects were found to be less than significant. Section 5.1 (air quality) focuses the effects of increased vessel transit times. As described in Section 5.1, these effects were found to be significant and unavoidable.

*No changes to the DEIR are required.*

**Response to Comment U-6:** State CEQA Guidelines (Section 15126.6) require only that an EIR evaluate a “range of alternatives to the project...which could feasibly attain the basic objectives of the project.” Therefore, only alternatives that fundamentally meet the project goals and objectives are considered in the DEIR. Ranking of alternatives to determine the degree to which each meets the project objectives or goals is not a requirement of CEQA.

*No changes to the DEIR are required.*



**California Fish and Game Commission**

1416 Ninth Street  
Sacramento, California 95814  
(916) 653-4899

**Letter V**

and

**California Marine Life Protection Act Initiative Team**

via email

**Comments on MLPA Central Coast Environmental Process Documents.**

Dear Sirs and Madams,

I am submitting these written comments on the MLPA Central Coast Draft Environmental Review Process Documents for your consideration. I served as an alternate member on the MLPA Central Coast Regional Stakeholder Group, where I represented scuba divers. I have dived regularly in that region since 1978, and made my home there since 1984. I am a professional underwater photographer.

I have received copies of the comments submitted by my colleague, Mr. Jesús C. Ruiz, and those jointly submitted by Kate Wing, Tim Eichenberg, and Steve Shimek. I wish to add my voice to all the points made in both comment letters, and could easily copy and paste both in their entirety and sign my name to them. Rather than redundantly submit those texts, I will amplify on some points made therein.

**Socio-Economic Analysis: Still Time to Achieve Better Balance**

Wing, Eichenberg and Shimek point out that *'The DEIR accurately states in Section 4.1 that "CEQA does not require the consideration of direct economic or social factors in its impact analyses," and CEQA provides that "economic or social effects shall not be treated as significant effects on the environment."'*

Despite the lack of a requirement, the presentation of **balanced, accurate and complete** socio-economic background should contribute to improved quality of decisions made. We are therefore gratified to see thirteen pages (pp 28-36 of Chapter 7, plus four maps) on non-consumptive activity, referred to as "recreation." We note that non-consumptive scuba diving activities, while mostly recreational in their nature, drive an industry of \$100 million annually in the Central Coast. Each year, on the order of 60,000 dive-days are spent at Cannery Row in Monterey, and upwards 160,000 in the Central Coast as defined for MLPA. These are major socio-economic considerations.

An entire chapter, comprising 34 pages is devoted to "Consumptive Uses and Socioeconomic Considerations." This is almost triple the amount of information presented on non-consumptive "recreation" and the imbalance is troubling.

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Representatives of the scuba diving community have often pointed out the State's failure to achieve or even attempt to achieve parity in the study of non-consumptive ocean activity viz. consumptive activity. There is vastly more information about fishing than all non-consumptive activities combined. That is reflected in the DEIR. This despite the fact that scuba diving alone represents roughly ten times the value to the Monterey Bay regional economy of commercial fishing. This is one of many facts that have been presented to the Commission and Department in the course of the Central Coast MLPA Process by scuba divers.

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Continued

Myriad additional relevant socio-economic information has been available since its presentation last July, and in this case I have submitted another redundant copy, in hope that its contents will be combed for material to be included in the final EIR. The scuba diving community has, on its own, gathered and previously presented considerable information that could have contributed to the DEIR, and made it a better, more balanced, more complete document. We hope that opportunity will not be lost, as there is still time to amplify the DEIR for the final. Although the attached package of information represents the "best readily available science" on the socio-economics of scuba diving on the Central Coast, it is woefully inadequate. And the state of socio-economic information on other non-consumptive activities lags behind even this. Though the disparity in available socio-economic information has been recognized for almost two years now, the opportunity for the state to devote the modest resources necessary to correct the imbalance is as ripe now as it was two years ago.

### **Potential Environmental Impact of Kelp Harvesting at Recreational Sites Not Controlled**

While the shores of Monterey and Pacific Grove draw literally millions of non-consumptive beach-goers, wildlife watchers, kayakers, divers, joggers, and so on, each year, the marine life that attracts those people is also an important commercial resource. We are concerned that the regulations regarding kelp harvest in the portions of administrative kelp bed 220 lying in the Edward F. Ricketts SMCA and the Pacific Grove Marine Gardens SMCA will not achieve sustainable sharing of the kelp resource they were intended to do.

In particular, the draft regulations contain two errors. The current commercial users of kelp cut in these two proposed MPAs were obviously consulted for their maximum monthly use rates. Those rates were then granted as a permissible take to *every licensed kelp harvester in California*. That is the first error. As the quoted rates clearly represent maxima by the only current users, the draft regulations permit an unchecked increase in kelp cutting in these SMCAs. The intent was to cap it at roughly current levels.

The second error is the failure to recognize the seasonal nature of the kelp take in these areas, and to regulate accordingly. The current users of the kelp in these proposed SMCAs have told us their average and even maximum use of this kelp

V-2

kelp during the months of November, December, January, February and March is far below the proposed levels. These months are significantly different from the April-October season, when kelp is growing fast, sometimes to a dense mat on the surface. Starting in November, limited daylight limits growth, large swells tear out dense summer canopies, and kelp cover thins dramatically. For example, on December 27, 2006 huge seas cleared almost the entire visible kelp canopy from the Monterey and Pacific Shores. When this writer visited the area on Dec 30, no kelp at all was visible on the surface! Three months earlier birds literally walked on the stuff. As this resource is important to two consumptive businesses and thousands of non-consumptive users alike, regulations should preserve it for the benefit of all. Regulations can and should be adjusted to reflect the actual use in the November-March months. By their own records, the abalone-farming companies in Monterey report they harvest an average of 2.5 tons per month during November-March from the Cannery Row and Lover's Point areas, with a 4.08 ton maximum (based on records from 2001-2004, Art Seavey, pers. comm., March 2005). The balance of their kelp use from all other source areas average 16 tons and peaked at 19 tons in the November-March season.

While the current users of kelp growing in what will become the Edward F. Ricketts State Marine Conservation Area in south Monterey Bay and the Pacific Grove Marine Gardens SMCA to the northwest are generally recognized to be environmentally sensitive mariculturists conducting a sustainable activity, the potential environmental impact would be from others. These businessmen have stated repeatedly that this kelp is an important resource for them. It is relied upon to attract tens of thousands of non-consumptive divers, kayakers, and even restaurant patrons. It is habitat for everything from snails to sea otters. The drafted regulations virtually invite out-of-area kelp harvesters to take advantage of the proximity to a sheltered harbor and cut many times the all time high take each month. There is no protection of the resource this way, indeed these "regulations," as drafted, do nothing to regulate the extraction. Of course what is needed is to stipulate the maximum take as the *maximum total allowable kelp take* from the areas in question, and to set a lower total allowable take in the November to March months when the kelp canopy thins or even disappears. We propose to base maximum total monthly kelp take in these areas on a liberal upward rounding of the Monterey abalone farmers' own reported peak use:

<u>Area</u>	<u>Max monthly Kelp take, April-October</u>	<u>Max monthly Kelp take, November-March</u>
<i>Ricketts SMCA</i>	12 tons	5 tons
<i>PG SMCA</i>	44 tons	20 tons

My thanks go to all commissioners and staff who have devoted their time to read these comments and consider them.

Respectfully Submitted,

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Continued

**Marc Shargel**  
**Sea Life Photographer**  
**Former Alternate Member, MLPA Central Coast Regional Stakeholder Group**

**Response to Letter V, from Marc Shargel**

**Response to Comment V-1:** Comments noted. Note that economic impacts are not a topic of analysis that is addressed under CEQA; therefore, the inclusion of additional information in the DEIR on the socioeconomics of scuba diving would not fundamentally alter the impact analysis in the DEIR. See Master Response 3.0.

*No changes to the DEIR are required.*

**Response to Comment V-2:** The Department disagrees. Contrary to the statement that this will "permit an unchecked increase in kelp cutting..." the proposed regulation adds both a cap on individual monthly landings as well as a restriction to only hand harvest. Existing regulations allow any permitted harvester to take any amount of kelp by any means in this area.

*No changes to the DEIR are required.*

January 6, 2007

MLPA Central Coast CEQA  
Department of Fish and Game  
Marine Region  
ATTN: John Ugoretz  
20 Lower Ragsdale Drive, Suite 100  
Monterey, CA 93940

Re: Comments on Draft EIR for the Marine Life Protection Act

As members of the Ohlone Native American community, we would like to comment on several matters of concern. We believe that, contrary to CEQA requirements, this report has failed to consider the environmental consequences of this project on the potential impacts to Native American cultural sites on the coast, including those currently under water.

8.4.5.6, Cultural Resources states that “The study region does not contain any known and recorded TCPs [Traditional Cultural Properties], but there may be unknown and unrecorded TCPs in the area. ... Therefore, the Proposed Project would not contribute to any cumulative impact on TCPs that could occur.”

Further, 7.1.3.1. Methodology states that “no consideration is given for land-based resources that exist in on-shore areas, as the project will not physically affect adjacent land.”

Año Nuevo serves as an example of serious adverse impacts to a known Ohlone cultural site caused by Northern Elephant Seals. These massive marine mammals occupy at least one Ohlone burial site where human remains have been exposed as a result of their presence during breeding season. Attempts to monitor and protect this site from further destruction have been fraught with logistical problems. When the elephant seals are there, it is impossible to protect this burial site.

We are also concerned that no consideration seems to have been given to the impact on traditional cultural properties along the coast by increased traffic and facilities associated with marine interpretation, recreation and research. Yet 8.4.5.7. Population and Housing states that “ ... The extent of indirect effects on population growth from increased tourism and recreation as a result of MPA designation has been determined to be speculative. Therefore, the Proposed Project would not contribute to cumulative impacts associated with population growth along the coast.”

Our past involvement with the rebuilding of the Moss Landing Marine Lab, for example, has taught us that marine-related facilities, because of their need for strategic location, can result in significant and irreversible damage to ancient cultural and burial sites.

7.1.3.1 Methodology states that “Technical cultural resources investigation was not performed for this project because of its limited potential to adversely affect any resources that may be present in the area. Instead, this generalized discussion relies on publicly available documents and incorporates a recent records review conducted for a project proposed along the whole of the California coast.”

A map of known coastal Native American cultural sites, both on land and offshore, should be prepared by Jones & Stokes as a supplement to this EIR, so that it can be used as a resource to consider the current and possible future impacts of the Proposed Project. A report that includes this map, along with descriptions of the mapped sites, should be distributed to active members of

W-1

W-2

the affected Native American communities for review and comment on known or potential impacts of the MPAs within their traditional territories.

7.1.1.3. Physical Setting acknowledges the existence of underwater cultural sites, yet no provision has been made to provide management and protection of these significant cultural resources.

Although the locations of Native American sites are exempt from public disclosure, as Native Americans this information is essential in order to analyze this proposal in a way that will responsibly protect our ancestral lands.

We regret that native peoples were not consulted regarding the descriptions of our traditional cultural ways. The descriptions of the different tribes (i.e. Ohlone, Salinan and Chumash) in 7.1.1.1. Ethnographic/Prehistoric Setting are so brief and generalized that they fail to mention anything unique to any of these tribes. Not only that, they also give a false impression that the cultural practices mentioned were unique to that particular tribe, when in fact they are general features that were mostly shared by us all. It's as though someone with limited knowledge of central coast native history pulled a few statements out of a hat without any particular rhyme or reason, then assigned them to a tribe.

We also noticed that in Chapter 7. Social Resources, the Esselen, who were located immediately south of the Ohlone, were omitted along with the definition of their traditional territory and Hokan-family language.

In addition, we object to pre-European history being referred to as "prehistory," and request that an alternate term be used in this document.

We would like to see this portion of the report improved, especially because it will become part of the public record and be subject to future reference.

Thank you for granting us this brief extension period in order to allow us to properly prepare and communicate our concerns. It is important to remember that this coastline was originally populated by our native ancestors and we appreciate the opportunity to responsibly protect California's cultural heritage.

Sincerely,

Jakki Kehl  
Mutsun Ohlone  
720 N. 2<sup>nd</sup> St.  
Patterson, CA 95363  
510.701.3975 (cell)

Linda Yamane  
Rumsien Ohlone  
1585 Mira Mar Ave.  
Seaside, CA 93955  
831.394.5915 (home)  
831.333.1600 (work)

cc: CEQA  
Native American Heritage Commission  
Governor's Office

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Continued

W-3

W-4

W-5

W-6

**Response to Letter W, from Jakki Keal and Linda Yamane**

**Response to Comment W-1:** The commenter raises concerns regarding potential impacts to cultural sites along the coast resulting from actions that are not part of the Proposed Project. First, the Proposed Project does not change the level of protection provided to marine mammals through the federal Marine Mammal Protection Act and other state and federal statutes and regulations. Thus, the Proposed Project does not change the existing logistical situation regarding impacts of marine mammals on shore-based sites identified by the commenter. Additionally, the Proposed Project does not include new roads, facilities, or other infrastructure associated with marine interpretation, recreation or research. In fact, the Proposed Project considered the proximity of existing research facilities as a site selection criteria to facilitate new research and education without the creation of additional facilities. The development of new facilities or infrastructure in the future would be independently subject to further CEQA review by the applicable local jurisdiction or lead agency. Effects on cultural resources result from future developments would be assessed as part of that independent environmental review.

*No changes to the DEIR are required.*

**Response to Comment W-2:** See Response to Comment W-1. The Proposed Project does not include activities that would harm existing underwater cultural sites or traditional cultural properties. By prohibiting extractive uses at some locations, the project may provide additional protection from incidental damage beyond current conditions.

The commenter is correct that specific information regarding Native American graves, cemeteries, and sacred places is exempt from public disclosure under the California Public Records Act (Government Code Section 6254.10). The commenter is therefore directed to the California Native American Heritage Commission and the California historical resources information centers operated by the California State Parks Office of Historic Preservation as informational resources regarding the potential for cultural resources at specific sites of interest.

*No changes to the DEIR are required.*

**Response to Comment W-3:** Comment noted. The inclusion of additional information in the DEIR on the descriptions of the different tribes previously mentioned would not fundamentally alter the impact analysis in the DEIR. As such, no change to the DEIR is warranted.

*No changes to the DEIR are required.*

**Response to Comment W-4:** Comment noted. This omission will be corrected.

*Revisions to the DEIR*



A description of the Esselen has been added to Section 7.1 of the DEIR (refer to chapter 3 of this Final EIR).

**Response to Comment W-5:** The term “prehistory” is used to reference the period of time before written history. It is not intended to refer to pre-European history.

*No changes to the DEIR are required.*

**Response to Comment W-6:** See Response to Comments W-4 and W-5.

*No changes to the DEIR are required.*



## Chapter 3. Revisions to the Draft Environmental Impact Report

### 3.1. Introduction

Comments discussed in Chapter 2 of this FEIR have resulted in revisions to the DEIR. Revisions have also resulted from Commission-directed changes to the Proposed Project, and are discussed in this chapter. All DEIR revisions are shown below. Text to be deleted is shown in ~~strikeout~~, and text that has been inserted is shown in underline.

### 3.2. Changes to Project Description since Issuance of DEIR

Following issuance of the DEIR, the Department made a number of technical and clerical changes to the proposed MPA regulations to clarify regulations, add consistency to sections, and to update the regulatory text to comply with statutory goals and objectives of the Marine Life Protection Act. The details of these changes can be found in the *New Initial Statement of Reasons and Proposed Regulations for Changes to Section 632, Title 14 CCR Regarding Marine Protected Areas*, available online (<http://www.dfg.ca.gov/MRD/mlpa/regulatorydocs.html>). Changes relevant to the Proposed Project, as described in the DEIR, include adjustment of the Proposed Project boundaries in order to clarify new kelp harvest regulations for some new conservation areas, and changes to improve the enforceability of proposed MPAs. The boundaries of Alternatives 1 and 2 were not revised. The following summarizes the differences between the original and new Proposed Project:

- Clarification that all existing fishing statutes and regulations still apply in MPA areas has been added to the general regulations subsection;
- The provisions that would authorize fishing in certain times for disabled persons within the Edward F. Ricketts State Marine Conservation Area (SMCA) have been modified;
- Options are provided to potentially allow the continued take of kelp in the Año Nuevo and Cambria state marine reserves (SMRs), converting them to SMCAs;
- Options are provided to potentially allow for the continued commercial take of spot prawn in the Soquel Canyon and Portuguese Ledge SMCAs;
- An allowance for minor incidental catch that is almost certain to occur in the course of commercial squid fishing has been added to SMCAs which allow the take of squid but not other common bycatch species;
- The terms under which kelp may be harvested within certain MPAs have been clarified and changes made to the commercial kelp harvesting

regulations [subsections 165(b) and (c)] to properly cross reference the sections;

- The boundaries of the Big Creek SMCA and SMR have been adjusted so that all no-take area falls within the SMR.

### 3.3. Summary of Environmental Effects

The revisions to the DEIR reflect minor changes to the boundaries of MPAs as described above. For instance, habitat cover type acreages protected within various MPAs have been adjusted according. These revisions are minor in nature and do not represent substantial changes from what was originally proposed in the DEIR. Furthermore, regulatory changes regarding kelp harvest and spot prawn take reduce the anticipated effects of the Proposed Project on commercial harvesters and fishermen. New significant impacts have not come to light as the result of these changes, nor has a substantial increase the severity of anticipated environmental effects described in the DEIR been identified. Therefore, pursuant to Section 15088.5 of CEQA Guidelines and 40 C.F.R. 1502.9, the DEIR does not require recirculation prior to certification.

### 3.4. Revisions

#### 3.4.1. Executive Summary

*The following text has been added to the Executive Summary, page ES-10:*

The Proposed Project and Alternatives, excluding the No-Project Alternative, would increase conservation benefits and create improved ecological MPA network components relative to existing MPAs. With respect to the amount of area receiving any level of protection, Alternative 2 would provide the most protection, and has been identified as the environmentally superior alternative under CEQA, while Alternative 1 would provide the least protection, and falls short of meeting the MLPA intent for a cohesive biological network. The Proposed Project would fall in between the two alternatives in terms of amount of area protected. The Proposed Project, however, provides for the most consistent and enforceable regulations and simple and enforceable boundary descriptions. It is the only alternative that could realistically be implemented with regulations that could be enforced and prosecuted with a higher likelihood of success, and is therefore more likely to achieve the full range of MLPA goals and objectives. The No-Project Alternative currently provides the least protection compared to the Proposed Project and Alternatives 1 and 2.

*The following text has been added to the Executive Summary, page ES-12:*

Based on input during the public scoping period, several issue areas of public concern have been identified regarding the Proposed Project. Some of the issues raised might be considered controversial. The existence or perception of public controversy in and of itself does not require the preparation of an EIR; however, the CEQA guidelines

do require that the EIR identify areas of known controversy. The issues of apparent greatest concern raised in comment to date are highlighted below.

### 3.4.2. Chapter 2. Project Description

*The following tables have been revised in Chapter 2, Section 2.4. Proposed Project, page 2-12:*

**Table 2-2. Overall Summary for Proposed Project**

Type of MPA*	Total Proposed	Area (Square Miles)	Percent of Study Region
State Marine Reserve	15	<del>96.64</del> <u>98.73</u>	<del>8.40</del> <u>8.59</u>
State Marine Park	2	6.35	0.55
State Marine Conservation Area	12	<del>100.94</del> <u>98.80</u>	<del>8.77</del> <u>8.59</u>
<b>All MPAs Combined</b>	<b>29</b>	<b>203.87</b>	<b>17.73</b>

\* These are proposed MPA designations, not levels of protection assigned by the SAT. The southern portion of the proposed Morro Bay SMRMA was included with the SMRs for the analysis. The remainder of the proposed Morro Bay SMRMA was included with the SMCAs for the analysis and count of proposed MPAs.

**Table 2-3. Individual MPAs in Proposed Project**

MPA Name <sup>a</sup>	Level of Protection <sup>a</sup>	Size (Square Miles)	Along-Shore Span (Miles) <sup>b</sup>	Depth Range (Feet)
Año Nuevo SMR		11.07	8.4	0–175
Greyhound Rock SMCA	3	11.81	3.1	0–216
Natural Bridges SMR		0.58	4.1	0–21
Soquel Canyon SMCA	1	23.41	7.8	247–2,113
Portuguese Ledge SMCA	1	10.91	5.4	302–4,838
Elkhorn Slough SMR		1.48	4.4	0–10
Elkhorn Slough SMP	4	0.09	1.4	0–10
Moro Cojo SMR		0.46	5.0	0–10
Edward F. Ricketts SMCA	3	0.22	1.0	0–74
Lovers Point SMR		0.30	1.0	0–88
Pacific Grove SMCA	3	0.93	1.5	0–151
Asilomar SMR		1.51	2.3	0–172
Carmel Pinnacles SMR		0.53	1.0	69–223
Carmel Bay SMCA	3	2.12	3.1	0–471
Point Lobos SMR		5.36	4.7	0–408
Point Lobos SMCA	2	8.85	3.2	268–1,858
Point Sur SMR		9.72	5.4	0–183
Point Sur SMCA	1	9.96	5.4	139–624
Big Creek SMCA	2	<del>10.14</del> <u>8.00</u>	2.5	0–1,964

MPA Name <sup>a</sup>	Level of Protection <sup>a</sup>	Size (Square Miles)	Along-Shore Span (Miles) <sup>b</sup>	Depth Range (Feet)
Big Creek SMR		<del>12.35</del> <u>14.47</u>	<del>3.3</del> <u>6.1</u>	0–2,393
Piedras Blancas SMR		10.40	6.4	0–157
Piedras Blancas SMCA	1	8.76	4.9	94–337
Cambria SMP	4	6.26	5.8	0–105
Cambria SMR		2.32	3.5	0–99
Morro Bay SMRMA	1, 3 <sup>c</sup>	3.01	9.4	0–22
Morro Bay East SMR		0.30	1.4	0–10
Point Buchon SMR		6.66	2.9	0–208
Point Buchon SMCA	1	11.55	5.9	191–377
Vandenberg SMR		32.84	14.3	0–127

<sup>a</sup> Listed north to south. Symbols following proposed MPA name indicate level of protection as determined by the SAT: 1 indicates SMCA High, 2 indicates SMCA Moderate, 3 indicates SMCA Low, and 4 indicates SMP Low. Level of protection was used in the SAT evaluation.

<sup>b</sup> Along-shore span measured as direct line from one end of the MPA to the other.

<sup>c</sup> 1 for southern portion, 3 for northern portion.

**Table 2-5. Habitat Representation in Proposed Project**

Habitat	Percentage of Habitat in Each Type of MPA*			
	SMR	SMP	SMCA	Total
<b>Intertidal</b>				
Sandy or gravel beaches	<del>21.00</del> <u>21.48</u>	2.49	<del>4.42</del> <u>3.94</u>	<b>27.91</b>
Rocky intertidal and cliff	<del>26.38</del> <u>27.23</u>	1.80	<del>5.07</del> <u>4.22</u>	<b>33.25</b>
Coastal marsh	39.56	3.89	9.88	<b>53.33</b>
Tidal flats	44.81	4.86	19.59	<b>69.26</b>
Seagrass beds (0–30 meters): Surfgrass	<del>29.34</del> <u>31.08</u>	2.99	<del>7.77</del> <u>6.03</u>	<del>40.10</del> <b>38.36</b>
Seagrass beds (0–30 meters): Eelgrass	28.67	0.62	70.71	<b>100.00</b>
Estuary	30.32	1.02	23.19	<b>54.53</b>
<b>Soft Bottom</b>				
0–30 meters	<del>15.20</del> <u>14.69</u>	1.69	<del>1.05</del> <u>1.56</u>	<b>17.94</b>
30–100 meters	<del>4.85</del> <u>4.99</u>	0.08	<del>8.95</del> <u>8.82</u>	<b>13.88</b>
100–200 meters	1.56	0.00	21.49	<b>23.05</b>
>200 meters	<del>6.68</del> <u>6.67</u>	0.00	<del>12.91</del> <u>12.92</u>	<b>19.59</b>

Habitat	Percentage of Habitat in Each Type of MPA*			
	SMR	SMP	SMCA	Total
<b>Hard Bottom</b>				
0–30 meters	<del>22.27</del> <u>22.81</u>	1.82	<del>4.91</del> <u>4.36</u>	<del>29.00</del> <u>28.99</u>
30–100 meters	<del>41.56</del> <u>11.64</u>	0.00	<del>45.76</del> <u>15.66</u>	<del>27.32</del> <u>27.30</u>
100–200 meters	0.07	0.00	36.83	<b>36.90</b>
>200 meters	0.19	0.00	20.73	<b>20.92</b>
<b>Kelp Forest</b>				
Average kelp (1989, 1999, 2002, 2003)	<del>24.50</del> <u>25.86</u>	5.26	<del>6.17</del> <u>4.26</u>	<del>35.93</del> <u>35.38</u>
Persistent kelp	<del>47.93</del> <u>20.45</u>	10.38	<del>9.12</del> <u>6.61</u>	<b>37.44</b>
<b>Submarine Canyon</b>				
0–30 meters	12.39	0.00	24.78	<b>37.17</b>
30–100 meters	5.88	0.00	4.07	<b>9.95</b>
100–200 meters	4.79	0.00	14.03	<del>18.84</del> <u>18.82</u>
>200 meters	7.41	0.00	14.99	<b>22.40</b>

\* These are proposed MPA designations, not levels of protection assigned by the MLPA Master Plan Science Advisory Team. The southern portion of the proposed Morro Bay State Marine Recreational Management Area was included with the SMRs for the analysis. The remainder of the proposed Morro Bay SMRMA was included with the SMCAs for the analysis.

*Figure 2-1a has been replaced with the following updated figure below.*

### 3.4.3 Chapter 4. Consumptive Uses and Socioeconomic Considerations

*The following text has been changed in Chapter 4, Section 4.2.1.1. Commercially Harvested Species, page 4-3:*

Brief profiles of the most important commercial fisheries<sup>1</sup> within the central coast study region ~~can be found in Appendix D~~ are provided below.

### 3.4.4. Chapter 5. Physical Resources

*The following text has been changed in Chapter 5, Section 5.1.3.1. Methodology, page 5-6, Table 5.1-3:*

~~Table 5.1-3. State and Federal Attainment Designations for Air Basins in the Project Area~~ Number of Vessels Potentially Displaced by Fishery

*The following text has been changed in Chapter 5, Section 5.1.3.3. Environmental Impacts, page 5-12 footnote 1:*

<sup>1</sup> Fishing block data over the past 25 years indicate a substantial decline in the number of fishing vessels operating within the central coast study region, from 1,803 vessels in 1981 to 612 vessels in 2005 (Ugoretz pers. comm.). Commercial fishing licenses also follow this decline as shown in Chart 4-1.

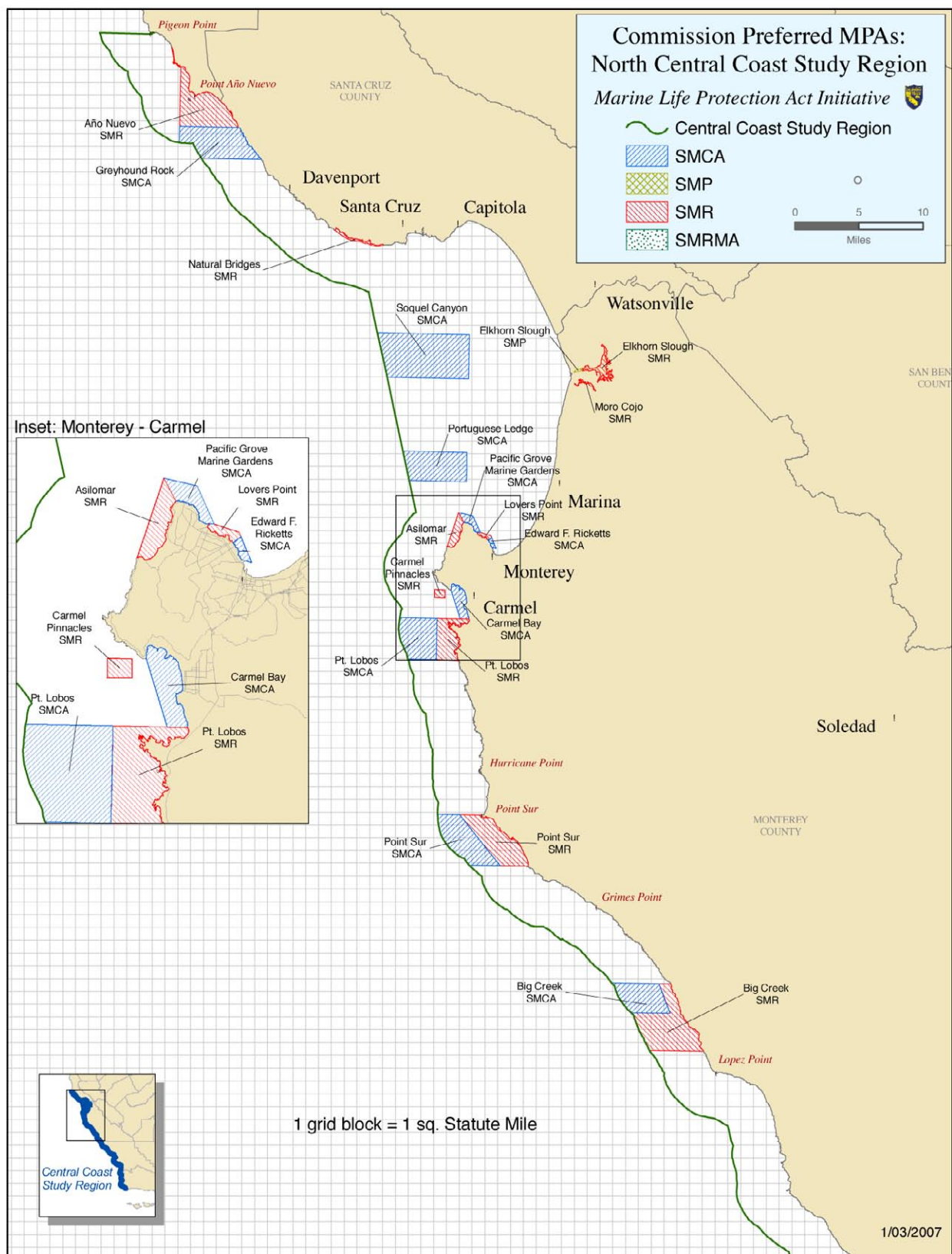
*The following text has been changed in Chapter 5, Section 5.1.3.3. Environmental Impacts, page 5-13:*

Recreational fishing vessels also contribute to air emissions in the study region. The emissions associated with recreational vessels are not quantifiable with available data. However, there is a possibility that emissions could increase due to the same mechanism as for commercial vessels, i.e., displacement. The extent of displacement of recreational fishing effort, and associated increases in travel distances by recreational vessels, if any, are speculative. In addition, any increase in transit distances and associated emissions would be at least partially offset by more restrictive air quality standards for outboard motors, which will result in the phasing out of older outboard motors and replacement with newer, lower-emission motors. Finally, While changes in transit patterns associated with the Proposed Project are anticipated to be limited due to the factors identified above (Section 5.1.3.1 Methodology), increased criteria pollutant emissions may occur on certain peak days when fishing conditions are favorable to recreational anglers. Emissions associated with recreational vessels are also subject to ARB regulation.

### 3.4.5. Chapter 7. Social Resources

*The following text has been added in Chapter 7, Section 7.1.1.1 Ethnographic/Prehistorical Setting, page 7-1:*





SMCA = state marine conservation area      SMP = state marine park  
SMR = state marine reserve      SMRMA = state marine recreational management area

Source: CDFG, 2007

**Note:** Project features and data layers can be viewed in greater detail online at <http://marinemap.org/mlpa/viewer.htm>



The study region encompasses the traditional home of (from north to south) the Ohlone, Esselen, Salinan, and Chumash tribes.

The Ohlone, formerly known as the Costanoan, occupied the coast from the San Francisco Bay in the north to just beyond present-day Carmel in the south, and as much as 60 miles inland. The Ohlone are a linguistically-defined group, speaking eight different but related languages and composed of several smaller, autonomous groups. The Ohlone languages, together with Miwok, comprise the Utian language family of the Penutian stock. They were hunter-gatherers, utilizing only the native flora and fauna for subsistence and tool-making, and practicing a rudimentary form of agriculture. Acorns and various seafoods formed the basis of their diet, with a wide range of other foods exploited to a lesser extent, including assorted seeds, buckeye, berries, roots, land and sea mammals, waterfowl, reptiles, and insects. Their early agricultural practices entailed pruning and seasonally re-seeding locally occurring plants to optimize production. Acorns were among several of the foods stored for months at a time. Controlled burning of vast areas of land was carried out to promote the growth of seed-bearing annuals and to increase the available grazing areas for deer, elk, and antelope (CDFG 2005a).

The Esselen occupied land south of the Ohlone, and are thought to have been largely replaced or absorbed by the later-arriving group. The Esselen are referred to by Thomas Roy Hester as “clearly...among the least-known groups in California” due to the limited and patchy information available on their material culture, social practices, and inhabitation patterns. They are also believed to be the first group California Indian group to become culturally extinct, disappearing in the early nineteenth century. From what information is available, the Esselen, in contrast to the Ohlone “collectors” who stored food and formed logistically organized labor groups, primarily practiced a foraging subsistence strategy, with daily collection of subsistence resources in the immediate surroundings of their residential bases and little or no usage of long-term storage. Their territory is thought to have encompassed coastal and interior zones from the Carmel Valley in the north to the Point Lopez in the south, including the Big Sur River drainage. (Hester, 1978; Moratto, 2004)

### 3.4.6. Chapter 11. References Cited

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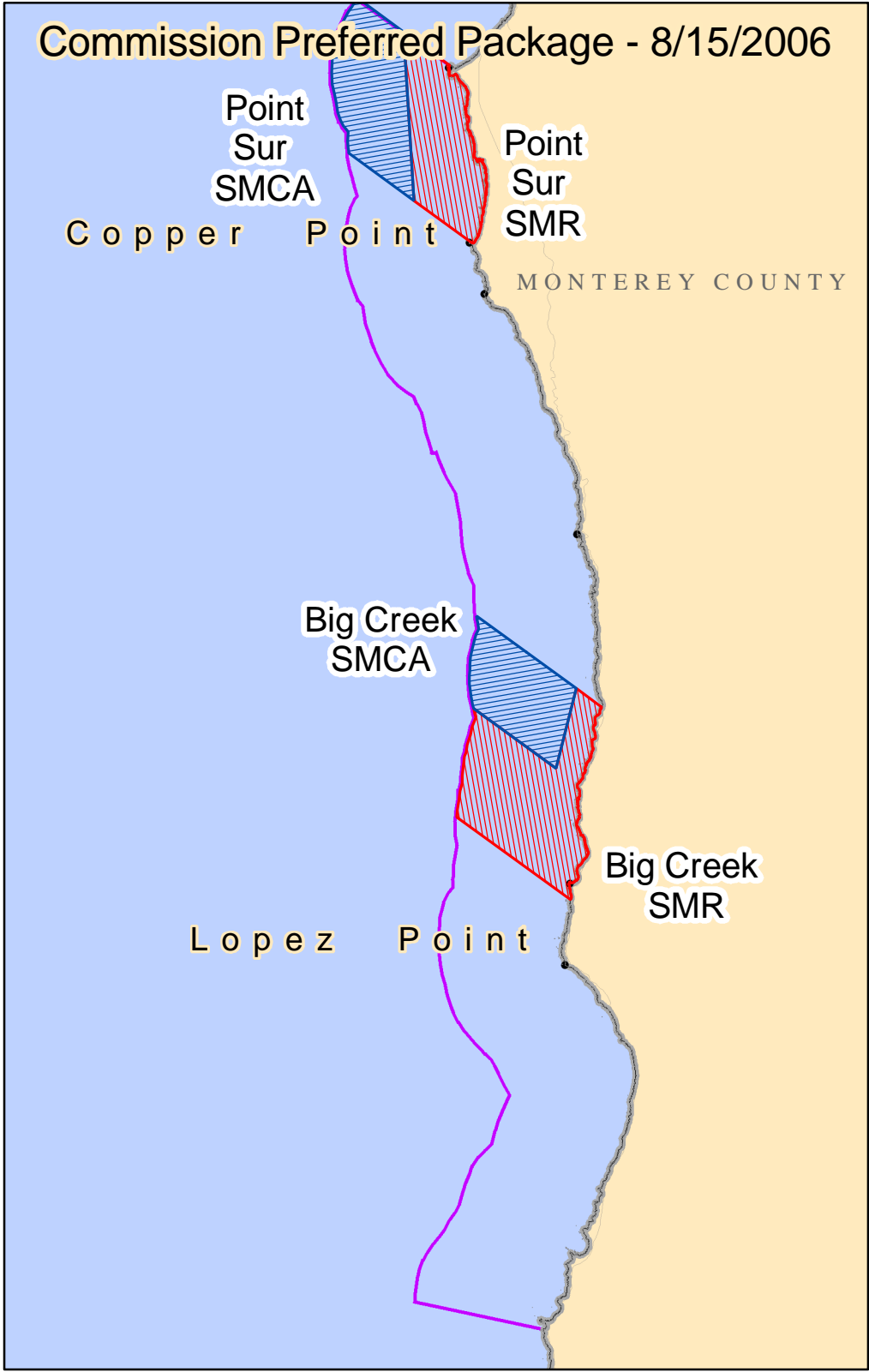
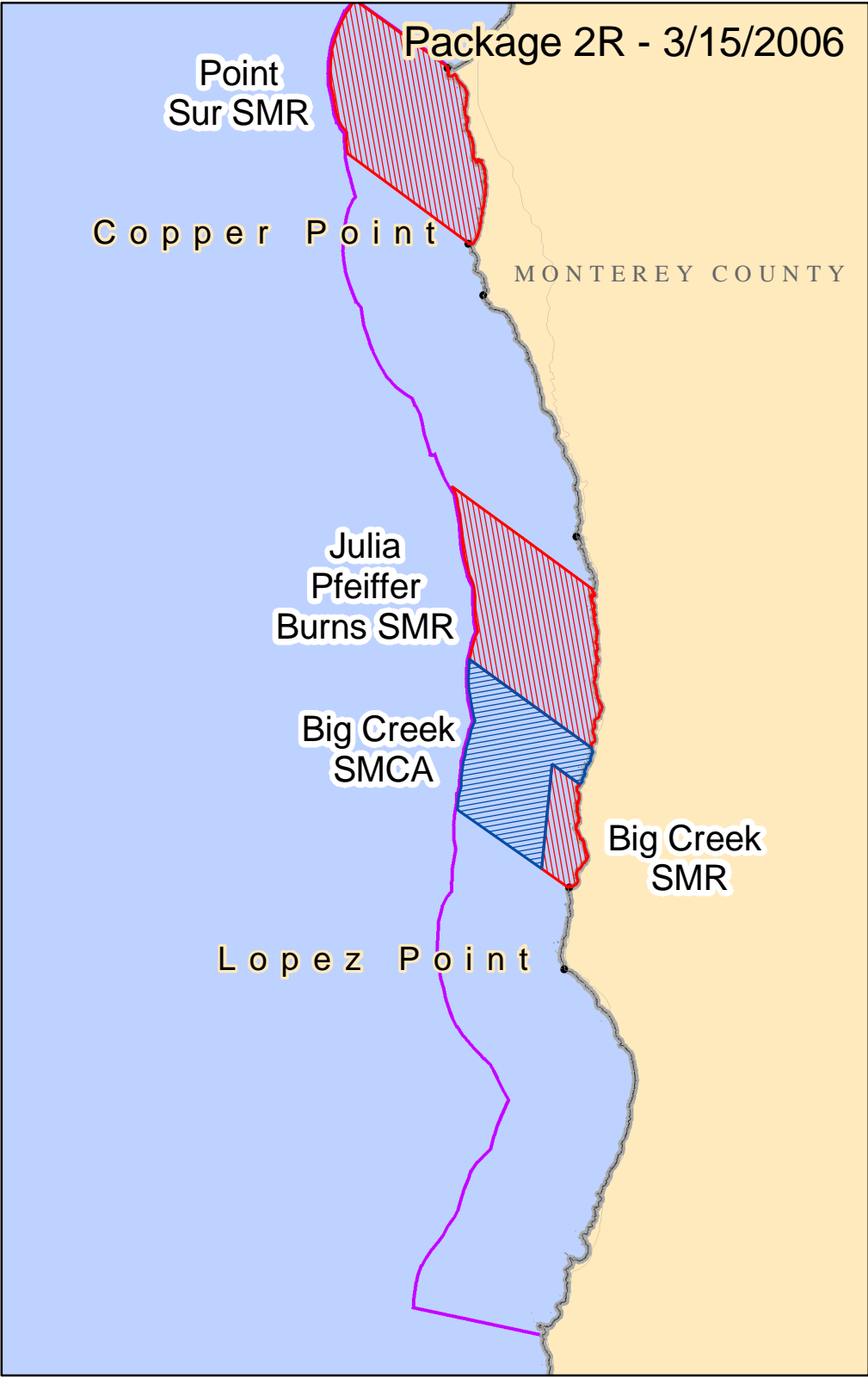
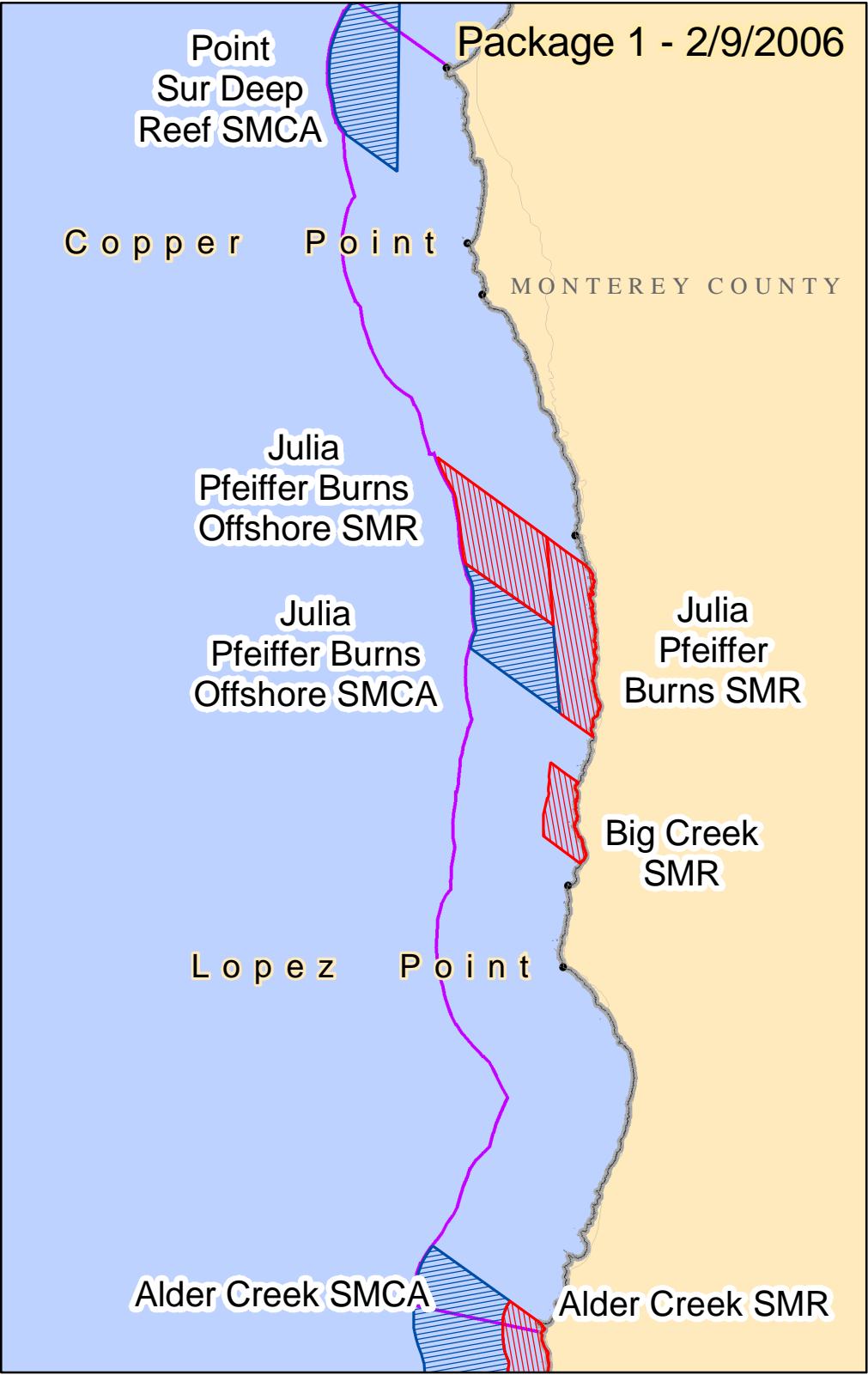
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#### **3.4.7. Appendix D. Side-By-Side Comparison Maps of the Proposed Project and Alternatives 1 and 2 by Subregion**

*The Subregion 4 figure in Appendix D has been replaced with the following updated figure below.*

# MLPA Central Coast Study Region: Subregion 4

*Point Sur to San Martin*



## MPA Packages 1, 2R and Commission Preferred





### 3.4.8. Appendix F. Species Likely to Benefit from MPAs in the Central Coast Study Region

*Appendix F has been replaced with the following updated text and tables:*

#### Some Key Species Likely to Benefit from Marine Protected Areas in the Central Coast Study Region

##### Introduction:

The Marine Life Protection Act [Section 2856(a)(2)(B)] calls for "An identification of select species or groups of species likely to benefit from MPAs". Well-designed MPAs could result in population-level effects, deemed to be beneficial to certain species or groups of species. These might include: 1) increases in abundance, 2) changes in population size structure resulting from increases in the number of individuals living to achieve larger body sizes and older ages, 3) increases in reproductive output due to the increased abundance of larger, older individuals. At the multi-species community level, well-designed MPAs could result in changes in community-level parameters over time, such as diversity and structure (defined as the result of species present in the community and their abundances), which can be distinguished from those occurring in non-MPAs. These changes might result in differences in community functions among MPAs and other areas.

It is important to note that not all MPAs in all areas will necessarily have all of these results. The overall benefit to any individual species will necessarily depend upon the final MPA design. Additionally, not all individual MPAs or groups of MPAs will necessarily lead to benefits for all species. A variety of design considerations must be taken into account when developing MPAs in order to maximize the potential benefits to the broadest range of species.

In this section, the criteria, discussion, and resultant list focus on some individual species that may benefit from MPAs. While this discussion and criteria consider the current status of species, they are not intended to explain how MPAs might be used as a fisheries management tool. Although MPAs may assist with rebuilding of depleted populations, current fisheries management strategies and rebuilding plans may achieve the same results with regards to single stock management. The goals and objectives of the Marine Life Protection Act primarily address protection of habitats, natural heritage, diversity, and abundance, and do not specifically consider fisheries management.

##### Discussion:

This list of some key species likely to benefit may be useful for designing MPAs and in the evaluation of MPAs. It is expected that the development of such a list be a dynamic process and subject to change as new information on the effects of MPAs and on species status becomes available. By definition, the primary change due to the

establishment of an MPA (whether a reserve, park, or conservation area) is a reduction in take. Those species likely to benefit **directly** by a decrease in the level of harvest are those that are targeted by fisheries, as well as those that are caught incidentally to fishing for the target species (i.e., bycatch) and cannot be successfully returned to the water following capture. It is expected that species likely to benefit will be afforded some degree of reduced mortality within the MPAs and that the local population within an MPA will experience increased survivorship, increased growth, and/or larval production within the MPAs. These benefits may or may not transfer to this species in other areas, depending on the amount of spill over (transport of new recruits or adults beyond the range of the MPA) and on existence of nearby sinks (that is, loss of individuals due to increased mortality in certain areas).

**Direct** benefits of MPAs may also accrue for seabirds, turtles, and marine mammals (pinnipeds and whales). For instance, aside from fish species, bycatch in some fisheries also includes species of turtles, marine mammals, and seabirds. Other human impacts include vessel activities (e.g., noise, motion, lights) in areas surrounding seabird breeding colonies and marine mammal rookeries, and inadvertent entanglement in associated gear. Decreasing or eliminating such disturbance, harassment, and other negative interactions within an MPA will reduce mortality of these species.

Besides impacting particular species, fishing **indirectly** can cause changes to the function of communities and ecosystems. For example, because large predators (e.g., yelloweye rockfish, bocaccio) often are the targets of fisheries, restricting harvest within an MPA likely will change the trophic dynamics (both predator and competitive interactions) of the system. Similarly, the abundance of macroalgae and sea grasses can be strongly affected by **indirect** species interactions that differ between MPAs and non-MPAs. In addition, species that already are fully protected (e.g., Marine Mammal Protection Act, Endangered Species Act, etc.) could be afforded additional **indirect** benefit from MPAs. For example, sea otters, pinnipeds, and some seabirds prey on some of those species (e.g., abalone, urchins, rock crabs, squid, and young rockfish) that could be expected to increase in size and abundance with increased protection of an MPA. It should be noted, however, that some of these top predators (i.e., sea otters) may locally reduce or prevent any realized gain in their prey species within an MPA.

Foraging seabirds and marine mammals can congregate at prey aggregations that are associated with hydrographic (e.g., fronts and eddies) and topographic features (e.g., seamounts, submarine canyons, promontories). These areas have been suggested to serve as “refugia” for top predators during periods of reduced food due to climate variability (e.g., El Niño). Parts of the Monterey Canyon, for example, are persistent foraging sites for many seabird and marine mammal assemblages. Some seabirds and mammals persistently forage near and downstream from upwelling centers, many located near coastal promontories along the California coastline. Affording MPA status to such areas could benefit all such predators.



Reduction in fishing effort by some specific gears within an MPA can also reduce or eliminate disturbance or destruction of the biological and physical structural components of benthic habitats, thereby **indirectly** benefiting those organisms associated with such habitats. Because change to ecosystem function can be complex, usually is not well documented, and therefore is not entirely understood, it is difficult to surmise all species that may **indirectly** benefit (or alternately suffer loss) from increased protection within MPAs. In addition, the species likely to benefit (and the magnitude of those benefits) will vary from place to place and will be dependent on local conditions.

#### Proposed List:

The attached table includes a draft list of some key central coast species most likely to benefit from MPAs. Species that occur in the central coast study region were included on this list primarily based on the extent of their adult mobility or dispersal, on their persistent use of specific sites to forage, grow, or breed, on certain life history characteristics that contribute to a species vulnerability to depletion, and on the status and trend of their population size.

The extent of movement of individual species generally changes among larval, juvenile, and adult life stages, and can influence how much protection that species receives from an MPA network. Many species in the central coast area have pelagic larval stages that disperse during several weeks to months, potentially over broad geographic areas, before settling to benthic habitats. Some of these species move from shallow water as juveniles to deeper depths as adults. Some species, such as squid, leopard sharks, and lingcod, exhibit seasonal patterns in movement that often are related to reproduction and/or feeding. MPAs are likely to have their greatest direct benefits on residential species. In general, MPAs offer direct protection to less mobile or sedentary species that locally aggregate in specific habitats (e.g., many of the rockfish species); these species can be especially vulnerable to local depletion by fisheries that target their specific habitats.

Mobile seabird and marine mammal species that breed and/or forage persistently in specific areas along the central coast also are included on this list. Mobile pelagic species (e.g., northern anchovy, Pacific sardine, salmon, herring etc.) represent a critical forage component in the central California coastal ecosystem, and protection afforded such species in an MPA could affect local ecosystem function. However, these pelagic species are less likely to benefit directly from the establishment of MPAs unless the size of the MPA encompasses their range of movement or the MPA is located to protect critical life stages (i.e., spawning or feeding aggregations, nursery grounds). For example, some salmon stocks can benefit from protection as they aggregate to spawn in areas near river mouths, and the herring fishery is highly regulated in their spawning areas in California bays.

Direct benefits of MPAs are expected to be much reduced for highly migratory species (e.g., swordfish, tunas, some sharks) that likely spend relatively little time inside local

coastal MPAs. Protection of these mobile species and their contributions to local marine ecosystems may best be addressed by larger-scale regulatory measures.

Summary:

One or more of the following criteria were used in identifying some key species most likely to benefit in the central coast region. Note that this list is not exhaustive and other criteria may be appropriate. The individual criteria in the attached table are not additive within each species; that is, all criteria are not equally weighted in importance when considering potential MPA benefits for these species:

- Species occurs on the central coast
- Species is either directly or indirectly affected by take
- Species has small-to-moderate adult neighborhood size (e.g., small = 0-5 km; moderate = 10-20 km) and moderate-to-large take (either current or historic take).
- Species population trend, stock size, or status is known to have declined or been reduced.
- Species has unknown population size or status, but shares life history traits and/or co-occurs with species of low or declining status.
- Species has particular life stage (e.g., uses persistent breeding, foraging, or nursery areas) amenable to spatial management
- Species size structure has shifted towards smaller individuals.
- Species habitat is vulnerable to disturbance
- Species of particular ecological significance (e.g. kelp, sea otter, etc.)

For each of the above, a “1” in the attached table means that species meets the criterion, a “0” means it does not meet the criterion, and “ND” means there is no data available. Comments about particular criteria or data sources are included where appropriate.

Species	Primary Bottom type (Rock/Sand)	Shallow Depth (ft.)	Deepest Depth (ft.)	sm-mod adult home range (sm 0-5 km mod 10-20 km)	Currently mod-large take	Historically mod-large take	Low Pop. Estimate (<40% unfished)	Size structure shifted toward sm indiv	life history trait vulnerable	life stage to benefit (e.g., spawning activity, nursery area)	habitat impacted (by human activity)	Ecologically Important (keystone or habitat forming)	Comments
				"ND" = No data	"ND" = No data	"ND" = No data	"ND" = No data	"ND" = No data	"ND" = No data	"ND" = No data	"ND" = No data	"ND" = No data	
Invertebrates													
black abalone	Rock	Intertidal	20	1	0	1	1	1	1	0	1	0	Only benefit in areas absent of sea otters
brown rock crab	Both	0	>330	1	1	1	ND	ND	0	0	0	0	Only benefit in areas absent of sea otters
corals	Rock	40	>500	1	0	0	ND	ND	1	0	1	1	Possible impacts from trawling or other bottom contact
Dungeness crab	Sand	0	755	0	1	1	ND	0	0	0	0	0	Due to management regime, no size shift
ghost shrimp	Sand	Intertidal	1	1	1	0	ND	ND	0	0	1	0	fish bait
gorgonians	Rock	40	>500	1	0	0	ND	ND	1	0	1	1	Possible impacts from trawling or other bottom contact
limpets	Rock	Intertidal	98	1	0	0	ND	1	0	0	1	1	removal impacts other species
littleneck clams	Coarse Sand	Intertidal	Intertidal	1	0	0	ND	ND	0	0	1	0	
market squid	Pelagic/Sand			0	1	1	0	ND	0	0	0	1	Both forage species and predators on small fishes
moon snail	Sand	Intertidal	499	1	0	0	ND	ND	0	0	1	0	
mud shrimp	Sand	Intertidal	1	1	0	0	ND	ND	0	0	1	0	
mussels	Rock	Intertidal	131	1	0	0	ND	ND	0	0	1	1	removal impacts other species
Pismo clam	Sand	0	82	1	0	1	0	1	1	0	0	0	very slow growing adults, long lived, 50 years, Only benefit in areas absent of sea otters
purple urchin	Both	0	302	1	0	0	ND	ND	0	0	0	1	Only benefit in areas absent of sea otters, removal impacts other species
red abalone	Rock	Intertidal	200	1	0	1	1	1	1	0	0	0	short-lived, non-feeding larval stage, Only benefit in areas absent of sea otters
red rock crab	Both	0	750	1	1	1	ND	ND	0	0	0	0	Only benefit in areas absent of sea otters
red urchin	Both	Intertidal	295	1	1	1	0	ND	0	0	0	1	Only benefit in areas absent of sea otters, removal impacts other species
rock scallop	Rock	0	98	1	ND	ND	ND	ND	1	0	0	0	Evidence of positive impact in So. Cal reserves
sand crab	Sand	Intertidal	1	1	0	0	ND	ND	0	0	0	0	
sea hares	Both	0	59	1	0	0	ND	ND	0	0	0	0	
sea pens	Sand	25	>300	1	0	0	ND	ND	1	0	1	1	Possible impacts from trawling or other bottom contact
sea stars	Both	Intertidal	>600	1	0	0	ND	ND	0	0	1	1	Keystone species in intertidal
sponges	Rock	Intertidal	>2000	1	0	0	ND	ND	1	0	1	1	Possible impacts from trawling or other bottom contact
spot prawn	Sand/Interface	150	1600	1	1	1	ND	ND	0	0	0	0	
turban snail	Rock	Intertidal	249	1	0	0	ND	ND	0	0	1	0	
worms	Both	Intertidal	>600	1	0	0	ND	ND	0	0	1	0	
Plant and Algae													
bull kelp	Rock	1	59	1	0	0	0	0	0	0	0	1	
eel grass	Sand	1	10	1	0	0	1	0	1	0	1	1	
giant kelp	Rock	20	121	1	0	0	0	0	0	0	0	1	
other intertidal algal species	Rock	Intertidal	Intertidal	1	0	0	0	0	1	0	1	1	
rock weeds	Rock	Intertidal	Intertidal	1	0	0	0	0	1	0	1	1	
sea palm	Rock	Intertidal	Intertidal	1	0	0	0	0	1	0	1	0	

Species	Primary Bottom type (Rock/Sand)	Shallow Depth (ft.)	Deepest Depth (ft.)	sm-mod adult home range (sm 0-5 km mod 10-20 km)	Currently mod-large take	Historically mod-large take	Low Pop. Estimate (<40% unfished)	Size structure shifted toward sm indiv	life history trait vulnerable	life stage to benefit (e.g., spawning activity, nursery area)	habitat impacted (by human activity)	Ecologically Important (keystone or habitat forming)	Comments
Fishes													
aurora rockfish	Sand/Rock	266	2930	ND	1	1	ND	ND	1	0	0	0	
bank rockfish	Rock	102	1489	ND	1	1	ND	1	1	0	0	0	declines in pop size and age/length in fishery
barred surfperch	Sand	0	240	1	1	1	ND	ND	1	0	0	0	piers;jetties;sandy beaches
bat ray	Sand/Rock	0	354	0	1	0	ND	ND	1	1	1	1	aggregate to spawn and breed inshore. Very often in the sandy areas in kelp beds, between the rocks. Top predator. Digging in sand has profound impact on invertebrate community.
big skate	Sand	7	2624	0	0	0	ND	ND	1	0	0	0	low fecundity
black rockfish	Rock	0	1200	1	1	1	1	1	1	0	0	0	Per Steve Ralston, CA population likely below 40%
black surfperch	Rock	0	150	1	1	1	ND	ND	1	0	1	0	piers; jetties; estuaries; kelp; low fecundity
black-and-yellow rockfish	Rock	0	120	1	1	1	ND	ND	1	0	0	0	
blackgill rockfish	Rock	289	2520	ND	1	1	0	ND	1	0	0	0	
blue rockfish	Rock	0	1800	0	1	1	0	1	1	0	0	1	filter barnacle larvae (Gaines and Roughgarden)
bocaccio	Rock	0	1578	0	1	1	1	1	1	0	0	1	Top predator; adults with low movement. declining lengths in central CA CPFV (Mason 1998)
bronzespotted rockfish	rock	246	1354	1	1	1	ND	ND	1	0	0	0	
brown rockfish	Rock	0	480	1	1	1	ND	0	1	0	0	0	locally important species in places like SF Bay since 1850
brown smoothhound	Sand	0	922	0	1	0	ND	ND	1	1	1	0	inshore nursery
cabezon	Rock	0	360	1	1	1	0	ND	0	0	0	0	
calico rockfish	Rock	0	1000	1	0	0	ND	ND	1	0	0	0	
California halibut	Sand	1	922	0	1	1	0	ND	0	1	0	0	nursery and spawning aggregations
California skate	Sand	43	5248	0	0	0	ND	ND	1	0	0	0	
canary rockfish	Rock	0	1440	0	0	1	1	1	1	0	0	0	declining lengths in central CA CPFV (Mason 1998)
chilipepper rockfish	rock	0	1611	0	1	1	0	1	1	0	0	0	declining lengths in central CA CPFV (Mason 1998)
china rockfish	rock	10	420	1	1	1	ND	ND	1	0	0	0	
copper rockfish	Rock	0	607	1	1	1	ND	1	1	0	0	0	
cowcod	Rock	132	1610	1	0	1	1	ND	1	0	0	1	
darkblotched rockfish	Both	95	2985	1	1	1	1	ND	1	0	0	0	
Dover sole	Sand	7	4500	0	1	1	0	ND	0	0	0	0	
English sole	Sand	0	1800	0	1	1	0	ND	0	0	0	0	
flag rockfish	Rock	100	1371	1	1	1	ND	ND	1	0	0	0	
gopher rockfish	Rock	0	282	1	1	1	0	ND	1	0	0	0	
grass rockfish	Rock	0	150	1	1	1	ND	ND	1	0	0	0	
greenblotched rockfish	Rock	180	1610	1	1	1	ND	ND	1	0	0	0	

Species	Primary Bottom type (Rock/Sand)	Shallow Depth (ft.)	Deepest Depth (ft.)	sm-mod adult home range (sm 0-5 km mod 10-20 km)	Currently mod-large take	Historically mod-large take	Low Pop. Estimate (<40% unfished)	Size structure shifted toward sm indiv	life history trait vulnerable	life stage to benefit (e.g., spawning activity, nursery area)	habitat impacted (by human activity)	Ecologically Important (keystone or habitat forming)	Comments
greenspotted rockfish	Both	98	1243	1	1	1	ND	ND	1	0	0	0	
greenstriped rockfish	Sand/Interfa ce	39	3756	1	1	1	ND	ND	1	0	0	0	
kelp greenling	Rock	0	426	1	1	1	ND	ND	0	0	0	0	
kelp rockfish	Rock	0	190	1	1	1	ND	ND	1	0	0	0	
leopard shark	Sand	0	515	0	1	0	ND	ND	1	1	1	0	estuarine pupping and nursery grounds. Very common in kelp beds, often up in the water column in kelp beds at night.
lingcod	Rock	0	1558	1	1	1	1	ND	0	1	0	0	reproductive aggregations
longnose skate	Sand	30	3506	0	0	0	ND	ND	1	0	0	0	low fecundity
longspine thornyhead	Sand	660	5760	0	1	1	0	ND	0	0	0	0	
monkeyface prickleback	Rock	0	80	1	1	1	ND	ND	1	0	1	0	homing; tidepools; large TL; potential local depletion
olive rockfish	Rock	0	564	1	1	1	ND	1	1	0	0	0	
Pacific hagfish	Sand/Rock	53	3168	0	0	1	ND	ND	0	0	0	0	
petrale sole	Sand	0	1800	0	1	1	1	ND	0	0	0	0	
pile surfperch	Rock	0	295	1	1	1	ND	ND	1	0	0	0	piers; jetties; estuaries; kelp. Low fecundity
pink rockfish	Rock	150	1200	1	0	0	ND	ND	1	0	0	0	
quillback rockfish	rock	16	899	1	1	1	ND	ND	1	0	0	0	
rainbow surfperch	Rock	0	165	ND	0	0	ND	ND	1	0	1	0	harbors; eelgrass. some evidence they move inshore and offshore, movements are not known; low fecundity.
redbanded rockfish	Rock	161	3756	ND	1	1	ND	ND	1	0	0	0	
rex sole	Sand	0	3756	0	1	1	0	ND	0	0	0	0	
rosethorn rockfish	Both	194	3756	1	1	1	ND	ND	1	0	0	0	
rosy rockfish	Rock	24	864	1	1	1	ND	ND	1	0	0	0	
rubberlip surfperch	Rock	0	165	ND	1	1	ND	ND	1	0	1	0	piers; jetties; kelp. Low fecundity
sand sole	Sand	0	1066	ND	1	1	ND	ND	0	0	0	0	
sanddab, Pacific	Sand	0	1800	0	1	1	0	ND	0	0	0	0	
shiner surfperch	Both	0	480	ND	1	1	ND	ND	0	0	1	0	estuaries; kelpbeds
shortspine thornyhead	Sand/Rock	56	5000	0	1	1	0	ND	0	0	0	0	Juveniles, in particular, are often found on rocks.
slender sole	Sand	30	3756	0	0	0	ND	ND	0	0	0	0	
speckled rockfish	Rock	100	1200	1	1	1	ND	ND	1	0	0	0	
splitnose rockfish	sand	262	2932	0	1	1	ND	ND	1	0	0	0	
squarespot rockfish	Rock	60	1000	1	1	0	0	ND	1	0	0	0	
starry flounder	Sand	0	1968	ND	1	1	0	ND	0	0	1	0	estuarine nurseries
starry rockfish	Rock	50	900	1	1	1	ND	ND	1	0	0	0	
striped surfperch	Rock	0	165	0	1	1	ND	ND	0	0	1	0	piers; jetties; estuaries; kelp
surf smelt	Sand	0	30	0	1	1	ND	ND	0	1	1	0	spawn in surfzone
topsmelt	Sand	0	85	ND	1	1	ND	ND	0	1	1	0	eggs laid on plants in backwater
treefish	Rock	0	320	1	1	1	ND	ND	1	0	0	0	
vermilion rockfish	Rock	0	1440	1	1	1	0	1	1	0	0	0	southern CA declines in length (Love et al.)
walleye surfperch	Both	0	597	1	1	1	ND	ND	0	0	0	0	sandy beaches; piers

Species	Primary Bottom type (Rock/Sand)	Shallow Depth (ft.)	Deepest Depth (ft.)	sm-mod adult home range (sm 0-5 km mod 10-20 km)	Currently mod-large take	Historically mod-large take	Low Pop. Estimate (<40% unfished)	Size structure shifted toward sm indiv	life history trait vulnerable	life stage to benefit (e.g., spawning activity, nursery area)	habitat impacted (by human activity)	Ecologically Important (keystone or habitat forming)	Comments
white croaker	Sand	0	781	0	0	0	ND	ND	0	0	0	0	
white surfperch	Both	0	230	1	1	1	ND	ND	0	0	1	0	estuaries
widow rockfish	Rock	0	2625	0	0	1	1	ND	1	1	0	0	known to aggregate around pinnacles/seamounts
wolf eel	Rock	0	740	1	0	0	ND	ND	0	1	0	0	sedentary;mate-for-life? Large size
yelloweye rockfish	Rock	49	1800	1	0	1	1	ND	1	0	0	1	Top predator.
yellowtail rockfish	rock	0	1801	0	1	1	0	1	1	0	0	0	declining lengths in central CA CPFV (Mason 1998)
Seabirds (breeding)													
Brandt's Cormorant		surface	50	0	0	0	0	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Brown Pelican		surface	10	0	0	0	1	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction, downlisting under consideration
Common Murre		surface	600	0	0	0	0	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Double-crested Cormorant		surface	50	0	0	0	0	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Least Tern		surface	surface	0	0	0	1	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Marbled Murrelet		surface	100	0	0	0	1	0	1	1	1	0	Significant decline in California population (Only found in northern part of central coast),potential for forage base increase, potential human disturbance reduction
Pelagic Cormorant		surface	50	0	0	0	0	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Pigeon Guillemot		surface	100	0	0	0	0	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Rhinoceros Auklet		surface	300	0	0	0	1	0	1	1	1	0	potential for forage base increase, potential human disturbance reduction
Seabird (Migrant)													
Grebe spp. (Western, Clark's)		surface	30	0	0	0	0	0	1	0	0	0	potential for forage base increase
Loon spp. (Pacific and Red-necked)		surface	50	0	0	0	0	0	1	0	0	0	potential for forage base increase
Northern Fulmar		surface	5	0	0	0	0	0	1	0	0	0	potential for forage base increase
Red-necked Phalarope		surface	surface	0	0	0	0	0	1	0	0	0	potential for forage base increase
Scoter spp. (Surf, White-winged)		surface	10	0	0	0	0	0	1	0	0	0	potential for forage base increase
Shearwater spp. (Sooty, Black-vented)		surface	30	0	0	0	0	0	1	0	0	0	potential for forage base increase
Marine mammals													
Gray whale		surface		0	0	1	0	0	0	0	0	0	potential for forage base increase
Harbor porpoise		surface		1	0	1	0	0	0	0	0	0	potential for forage base increase
Harbor seal		surface		0	0	1	0	0	0	1	1	1	potential for forage base increase, potential human disturbance reduction

Species	Primary Bottom type (Rock/Sand)	Shallow Depth (ft.)	Deepest Depth (ft.)	sm-mod adult home range (sm 0-5 km mod 10-20 km)	Currently mod-large take	Historically mod-large take	Low Pop. Estimate (<40% unfished)	Size structure shifted toward sm indiv	life history trait vulnerable	life stage to benefit (e.g., spawning activity, nursery area)	habitat impacted (by human activity)	Ecologically Important (keystone or habitat forming)	Comments
Short-beaked common dolphin		surface		0	0	0	0	0	0	0	0	0	potential for forage base increase
Southern Sea Otter		surface		0	0	1	1	0	0	0	0	1	potential for forage base increase
Steller's sea lion		surface		0	0	1	1	0	0	0	1	1	Ano Nuevo population has declined, potential for forage base increase, potential human disturbance reduction

